THE

Practical Teacher

A MONTHLY EDUCATIONAL JOURNAL.

Edited by JOSEPH HUGHES.

'*Knowledge is proud that he has learned so much,*
Wisdom is humble that he knows no more.'—COWPER.

VOL. X. NO. 9. NOVEMBER, 1890. PRICE, 6D. POST FREE, 7½D.

Honours Hygiene.

BY

ARTHUR NEWSHOLME, M.D., D.P.H. UNIV. LOND.,

Medical Officer of Health for Brighton.

TRADE NUISANCES.

MANY occupations are the source of considerable danger to the workers engaged in them. They are chiefly injurious by the inhalation into the lungs of some foreign agent, which produces serious inconvenience and irritation, or may be absorbed into the circulation and produce more remote effects.

The injurious agents may be classified under four heads:—

(1) Insoluble particles or dust.
(2) Soluble or partially soluble substances.
(3) Injurious gases or vapours.
(4) Effluvia from offensive trades.

It is evident that, as regards the effluvia named under (4), they might generally be included under the three previous heads, though it is convenient for our present purpose to keep them separate.

The occupations in which DUST is productive of injurious effect are very numerous. The *potter* is liable to inhale a fine earthy or silicious dust, which sets up irritation and disease in the lungs, known as *potter's asthma*. Millstone cutters and stone-masons suffer in a similar manner, but to a slighter extent. *Pearl cutters* inhale the fine particles of pearl dust which are very light. The organic part of the pearl is known as conchyoline. This gets into the circulation, and being carried by the blood to various parts of the body, produces inflammation at the ends of bones. *Needle and knife grinders* in the past have had a frightful mortality from inhalation of the dust, but this has now been greatly reduced by the introduction of improved methods of grinding. *Hemp and flax dressers* inhale a dust which is peculiarly irritating. Workers in *rags and in wool* are subjected to the ordinary dangers of dust. Not infrequently also small pox and other infectious diseases have been spread among the work-people. There is some danger of cholera in the same connection; and as a large quantity of rags is imported from Spain into this country, the importation without previous disinfection has been recently forbidden. The dust from fleeces of wool, and especially from the alpaca fleeces, has occasionally produced, in the neighbourhood of Bradford and Saltaire, an acute disease which is fatal in a few days. This disease is known as the *wool-sorter's disease*. It is undoubtedly due to the inhalation of dust containing the specific germs of a disease known as anthrax or splenic fever; the animals from which the wool was derived having suffered from this disease.

The *Miller* not infrequently suffers from a form of asthma, not so severe as potter's asthma, as the particles of flour are less hard and less irritating than those of clay.

Miners have in the past had a very high mortality, and as 1 in every 19 males, between 25 and 65, is a miner (Newsholme's *Vital Statistics*, p. 161), their rate of mortality is of great importance to the community. At least one-fifth of the mortality of miners is due to accidents. At the present time, if accidents are excluded, coal-miners have a surprisingly low death-rate, the improvement being in a large measure due to improvements in the ventilation of mines. *Miner's phthisis* has greatly decreased of late years, and among coal-miners it is now below the average for the whole community. Among Cornish miners, however, the mortality remains terribly high, the excess being chiefly due to phthisis and respiratory diseases.

Chimney sweeps are liable to a form of cancer, which is apparently excited by the irritation of soot. Their general mortality is high, and their liability to cancer appears to be eight times that for all males. (*Vital Statistics*, p. 163.)

Of SOLUBLE SUBSTANCES which produce disease in various occupations, the following are the most important:—

Artificial flower makers and those engaged in colouring arsenical wall papers suffer from the inhalation of arsenical vapours, as well as from the absorp-

tion of arsenic by the skin. An irritating cough is produced, accompanied by nausea and diarrhœa, with pains in the bowels and other symptoms.

Cigar-makers are liable to have their lungs irritated by the inhalation of the dust of the tobacco-leaf; but in addition serious symptoms are often produced by the absorption of the active principle, nicotine, into the system. Muscular weakness, palpitation, with irregular and sometimes intermittent action of the heart are among the symptoms.

Brass founders occasionally suffer from inhaling the dust of copper and zinc. The symptoms closely resemble those of ague. Those engaged in the manufacture of *bichromate of Potash* are apt to suffer from ulceration of the parts of the skin exposed to its action.

Workers with phosphorus, especially those engaged in making phosphorus matches, suffer from inhalation of the fumes of the pentoxide of phosphorus which are slowly evolved. This attacks the jaw-bone, and especially at the points where decayed teeth exist, sometimes producing a very serious necrosis (death) of the bone. Improved ventilation of workshops and careful attention to the teeth have greatly diminished the disease, but the extensive discontinuance of the use of yellow phosphorus on the matches, and the substitution of the red non-volatile phosphorus on the box, has done much more towards putting an end to this disease.

Workers in Lead are very liable to be poisoned by the metal, the effects being manifested chiefly in four occupations, viz.:—printers, earthenware makers, painters (including plumbers and glaziers) and file-makers. The lead is partly absorbed by the skin; in some cases it is inhaled, either as dust, or along with the fumes of turpentine; and frequently it is swallowed from the workman eating his meals with unwashed hands. The symptoms produced are gradual in onset; the worker suffers from malaise and indigestion, he becomes very constipated, and suffers from occasional attacks of severe colicky pains in the abdomen. If his gums are examined, a bluish line will be detected at their junction with the teeth. If the poisoning continues, the right hand becomes weak, and finally the patient cannot lift the hand, owing to paralysis of certain muscles of his fore-arm. Lead has a very injurious effect on the eliminatory organs, particularly the kidney. The worker in lead is liable to attacks of gout, and to an insidious and progressive form of renal disease. File makers and plumbers are the most prone to suffer. In the manufacture of white lead by the Dutch or stack process, there is great risk of inhalation of the dust when taking down the stacks and detaching the films of white lead from the plates of metal. The subsequent grinding of the white lead is done by the wet method, so that the danger during this process is minimised. In Professor Gardner's patent process for manufacturing white lead, electrolysis takes the place of chemical action, and the process is conducted in closed chambers, thus obviating the chief risks.

Workers with quicksilver, as in the making of looking glasses, are prone to suffer from poisoning by mercury. The gums become spongy, there is profuse secretion of saliva, and later on a nervous affection producing tremblings of the muscles may follow.

It may be convenient at this point to consider the remedies applicable in occupations in which danger arises from dust and soluble substances.

(1) In many of the cases described, the danger from dust is obviated by the adoption of *wet grinding*, as in the case of steel grinding. (2) When the dust cannot be avoided, the use of *steam fans*, to deflect the dust away from the workman, has been found successful; and (3) *free ventilation* of workshops has greatly diminished the mortality. (4) Where the preceding measures are inapplicable, the use of *respirators* should be enforced. Breathing through the nostrils ought to be carefully maintained, as thus the dust is in a large measure stopped before reaching the lungs, and conversation should be discouraged, as it commonly implies breathing through the mouth. (5) The dangers of lead poisoning, except in the manufacture of white lead by the stack process, may be avoided by strict attention to *cleanliness*. The hands ought to be washed before taking meals, and the mouth rinsed out with water containing a trace of sulphuric acid.

INJURIOUS GASES OR VAPOURS are evolved in various occupations. *Lace frame makers* frequently place a coke stove under their work in cold weather. Carbonic oxide is evolved, the presence of which even in minute quantities is very injurious. It poisons by causing asphyxia, a stable compound being formed with hæmoglobin which prevents proper aëration of the blood. The poisonous effects of coal gas when inhaled are in a large measure also due to carbonic oxide; and the new *water gas* owes its poisonous effects chiefly to the same agent. Water gas is formed by passing steam over iron and carbon; carbonic oxide and hydrogen being produced. Its chief danger consists in its not having a perceptible odour. In two or three fatal cases of poisoning by it, the blood shewed the appearances which are characteristic of poisoning by carbonic oxide.

Straw-bleachers suffer from the inhalation of sulphurous acid; *hat makers* from the vapour of ammonia. The ammonia is used as a solvent to the shellac with which the body of the hat is made stiff. *Toy balloon makers* suffer from inhaling the vapour of carbon disulphide, in which the india-rubber is immersed before the balloons are blown out. It causes headache, muscular pains, and mental depression, sometimes even leading to insanity. The *fur dyer* is subject not only to the dangers of dust, but also of the fumes of nitric acid, used to remove fat and give certain shades of colour to the fur.

The subject of the more special offensive trades must be left for consideration in the next issue of the *Practical Teacher*.

—o—

Tests in Mental Arithmetic.

STANDARD I.

1. What is 3 dozen and 4? 40.
2. What is the half of 40? 20.
3. What is $\frac{1}{4}$ of 40? 10.
4. What is $\frac{3}{4}$ of 40? 30.

5. What would 30 pencils cost at a halfpenny each? 1s. 3d.
6. How much would they cost at 3 a penny? 10d.
7. How many nuts would you get for 2½d. at 10 a penny? 25.
8. How many half-lbs. of tea can be made out of 9 lbs.? 18.
9. How many quarter lbs. can be made? 36.
10. A boy was 6 years of age 7 years ago. How old is he now? 13 years.
11. How old will he be in 9 years time? 22 years.
12. Take 22 from 2 score. 18.

STANDARD II.

1. How many boys are there in 6 desks, if there are 5 in each of 4 desks, and 4 in each of the others? 28.
2. How many must you add to 28 to make 3 score? 32.
3. What would 32 marbles cost at 8 a penny? 4d.
4. How many could you get for 5½d.? 44.
5. What would 72 eggs cost at 9 for a shilling? 8s.
6. How many could you get for 12s.? 108.
7. What will 35 lbs. of rice cost at 2d. per lb.? 5s. 10d.
8. How many pounds could you get for half-a-crown? 15.
9. How many sixpences could you get for £2 10s.? 100.
10. How many threepences could you get? 200.
11. A boy works a sum in 3 minutes. How many could he work in half an hour? 10.
12. How many could he work in ¾ hour? 15.

STANDARD III.

1. How much is ½ of a guinea? 10s. 6d.
2. How much is ¼ of a guinea? 5s. 3d.
3. How much is ¾ of a guinea? 15s. 9d.
4. What is the half of 15s. 9d.? 7s. 10½d.
5. What will a dozen eggs cost at 4 for 3½d.? 10½d.
6. What will 4 dozen cost? 3s. 6d.
7. How many minutes are there in 7 hours? 420.
8. How many sovereigns could you get for 420 shillings? 21.
9. What would 350 pens cost at 2s. a hundred? 7s.
10. How many could you get for 6d.? 25.
11. How many cwt. are there in 4 tons? 80.
12. What would 4 tons of coal cost at 6d. per cwt.? £2.

STANDARD IV.

1. What will 2 gals. of ink cost at 5d. a quart? 3s. 4d.
2. How much will 3 stone cost at 6s. per qr.? 9s.
3. What will 5 oz. of tea cost at 4s. per lb.? 1s. 3d.
4. What will 200 articles cost at half-a-crown each? £25.
5. What would they cost at 4s. each? £40.
6. How much would they cost at £1 5s. each? £250.
7. What part of a yard is 4 inches? $\frac{1}{9}$.
8. What part of 3 chains is 6 yards? $\frac{1}{11}$.
9. Add together ¼ and ⅛ of a quarter of a cwt.? 11 lbs.
10. What is $\frac{5}{7}$ of a guinea? 15s.
11. If 5 books cost 15s., what will 6 cost? 18s.
12. If 12 men can do a piece of work in 3 days, how long would it take 4 men? 9 days.

STANDARD V.

1. What is the difference between ¾ and $\frac{9}{12}$? Nothing.
2. What is the sum of the two fractions? 1½.
3. Add ¾ and half of ¾. 1⅛.
4. What will three gross of penholders cost at 9d. per dozen? £1 7s.
5. How much will 200 articles cost at 6s. 8d. each? £66 13s. 4d.
6. If £300 is lent for six months, how long should £200 be lent in return? 9 months.
7. How long should £400 be lent? 4½ months.
8. What fraction of half-a-crown is a florin? ⅘.
9. What decimal is it? ·8.
10. What is the fifth part of that decimal? ·16.
11. Find the interest on £300 for three months at 3 per cent. £2 5s.
12. What will £50 amount to at the same rate and in the same time? £50 7s. 6d.

STANDARDS VI. AND VII.

1. Take $1\frac{5}{12}$ from 2⅓. $\frac{11}{12}$.
2. Express that decimally. ·916.
3. What decimal of 3s. 6d. is 10½d.? ·25.
4. What fraction divided by $\frac{5}{6}$ equals $\frac{9}{16}$? ¾.
5. The side of a square room is 6⅔ yards; what is the area? 44⅘ sq. yds.
6. What is the interest on £8,000 for a month at 6 per cent.? £40.
7. How long would it take to gain £300? 7½ months.
8. What per centage is 5s. of £20? 1¼ per cent.
9. If 30 articles costing £1 are sold at a loss of 25 per cent., what is the selling price of each article? 6d.
10. If sold at 6d. each, but 25 per cent. was gained, what would have been the cost of the 30 articles? 12s.
11. What income will be derived from investing £3,600 in the Four per Cents. at 90? £160.
12. How much must be invested to obtain an income of £1,000? £22,500.

How a Scotch School was Examined.

INFANTS.

Reading.—Books—First class; Chambers' Infant Reader; read a sentence. Second class: Chambers' Graduated; read a line. Third class: Blackie's Graded; read a line.

Writing.—First class wrote James is a boy. Second class wrote capitals from A to K. Third class wrote small letters from K to Z.

Arithmetic.—First class took down numbers from dictation such as 29, 57, 82, and added them together, Second and third classes answered such questions as 4 and 3 ? 9 and 5 ? 6 and 9 ? 4 from 11 ? 6 from 13 ?

Singing.—Easy modulator exercise. One song taken.

Sewing.—Hemming and knitting to a few of the older ones.

Object Lesson.—'The Ostrich,' given by the teacher.

STANDARD I.

Reading.—A part of the class read from Royal Star Reader the lesson on 'The Sheep,' p. 45. Questions were asked on sheep shearing' weaving, etc. The rest read from Chambers' Graduated Reader the lesson on 'What Beasts Eat,' p. 45. Questions on appearance and habits of different animals. Nouns were also pointed out.

Writing.—The class was divided in three parts, A, B, and C. The A's wrote 'Beasts of prey can hold things with their feet.' The B's wrote 'Lions and tigers have strong sharp claws, and so have dogs and cats.' The C's, 'They have only hard hoofs to walk on.'

Arithmetic.—

A. (1) 609 + 780 + 590 + 17 + 403. Ans. 2,399.
(2) 34 + 902 + 746 + 605 + 793. Ans. 3,080.
(3) From 304 take 97. Ans. 207.

B. (1) 60 + 709 + 850 + 716 + 87. Ans. 2,422.
(2) 530 + 619 + 75 + 504 + 680. Ans. 2,408.
(3) From 732 take 29. Ans. 703.

STANDARD II.

Reading.—Star Reader No. II., 49, Ships; 62, 'The Spotted Leopard.' Questions. Chambers' Graduated Reader II., p. 109, 'Caught by the Tide.'

Grammar.—Nouns were taken and also adjectives. Grammar taken individually.

Writing.—Dictation.—'A third beam came to the hen house, and the cock rose up and stretched himself, and flapped his wings and crowed three times.' From Chambers' Graduated Reader, book II., p. 71, paragraph 6.

Arithmetic.—

A. (1) 7,009 + 684 + 7,090 + 582 + 7,019 + 6,705 + 5,080. Ans. 34,169.
(2) From 10,017 take 9,785. Ans. 232.
(3) Multiply 479,386 by 6. Ans. 2,876,316.

B. (1) 7,698 + 5,964 + 7,349 + 917 + 6,742 + 596 + 74. Ans. 29,340.
(2) From 4,262,710 take 375,694. Ans. 3,887,016.
(3) Multiply 58,379 by 4. Ans. 233,516.

STANDARD III.

Reading.—Books—Nelson's Star and Royal Scottish Readers. The lesson read was, 'The Lady of the Woods.' Grammar and Analysis taken from the same lesson.

Writing.—'Weary, hungry, and full of grief, the poor boy burst into tears; but soon he wiped his eyes and began to think what he should do. He could not see a star; he heard a low wind moaning through the wood; and then he felt flakes of snow falling upon him.'

Arithmetic.—

A. (1) Multiply seven hundred and ninety-eight thousand six hundred and forty-seven by nine thousand and seventy-six.
(2) Divide 798,365 by 89.
(3) Divide 1,346,789 by 179.
(4) From £1000 take £909 17s. 9¾d.

B. (1) Multiply 790,865 by 9,080.
(2) Divide one million by 19.
(3) Divide 2,398,645 by 892.
(4) Take £7,981 7s. 9¼d. from £10,070 1s. 10½d.

C. 1. Multiply seventy-nine thousand eight hundred and sixty-seven by nine thousand and eighty.
2. Divide 795,463 by 89.
3. Divide 1,357,864 by 193.
4. Add £9 7s. 8¾d., £19 18s. 9½d., £207 17s. 6¾d., £92 13s. 8½d., and £54 13s. 2½d.

Geography.—Beginning at St. Abb's Head, the Examiner took capes, openings, and counties as they came in regular succession round the coast. The rivers and monntains passed under nôtice, and he ended with a question or two on the principal towns.

History.—Beginning with the Coronation of Bruce, the Examiner took the most interesting events in the life of the Scottish patriot, and ended with his death in 1329. The Life of Queen Mary was taken, but not so particularly.

Repetition.—'The Beggar Man.' Nouns, verbs, and adjectives, taken from it.

STANDARD IV.

Reading.—Books—Nelson's Star and Royal Scottish Readers.'

Writing.—'The memory of that prayer made the singer even more tender-hearted; and she who was the idol of England's nobility now went about doing good. And on her early death, he who stood by her bed and smoothed her pillow, and lightened her last moments by his affection. was the little Pierre of former days,—now rich, accomplished, and one of the most talented composers of the day.'

Arithmetic.—

A. 1. Multiply £690 18s. 6½d. by 794.
2. Divide £3,040 16s. 8¼d. by 709.
3. How many ozs. in 16 cwts. 3 qrs. 14 lbs.?
4. 60,000 half-crowns to florins.

B. 1. Multiply £64 18s. 9½d. by 370.
2. Divide £6,004 18s. 3½d. by 890.
3. How much would I pay for 64 chairs at 25s. each.
4. 30,049 halfpence to sixpences.

Repetition.—1. 'Burial of Sir John Moore.'
2. 'The Village Blacksmith.'

Geography.—England—her rivers, mountains, chief seaports, manufacturing districts. Ireland—provinces—counties in Ulster—lakes of Ireland—productions. Where is linen manufactured? Where are the finest parts for scenery? Where is the Giant's Causeway? Name the lakes on the course of the Shannon?

History.—What is meant by Restoration of the Monarchy? When did it take place? These two questions formed the introduction to a full examination on the reigns of Charles II. and James II., with the causes of the Revolution, and the reason why William and Mary were called from Holland to assume the government.

STANDARD V.

Reading.—Star Reader; lesson taken, 'Story of Alice Ayres,' Part I.

Grammar.—One half of class did parsing and the other half analysis of sentences chosen by the examiner.

Writing.—'Thomas Edward, the naturalist, shot at and wounded a fine specimen of a tern. It fell into the sea some few yards out, and he waited till the waves brought it in. Just as he was going forward to lift it, two unwounded terns flew down, and each lifting it by a wing flew with their wounded companion out to sea, followed by two other birds. When they were tired they gently laid it down, and it was lifted up by the other two. In this manner they continued to carry it until they reached a rock some distance away.

'Edward at once went to the rock; but the terns swarmed about him and made the air rend with their cries. On approaching nearer, the wounded bird was lifted in the same manner and carried off till it was quite beyond his reach.'

Arithmetic.—

A. (1) Find by practice the value of 7813½, articles at £9 17s. 11¼d. each.
(2) Make out the following bill:—
27 yards at 7s. 6¾d. per yard.
19½ yards at 8s. 10½d. per yard.
204 yards at 5s. 1½d per doz. yards.
29¾ yards at 8s. 6d. per yard.
(3) How much should be paid for 3 tons 7 cwts. if I pay 17s. 9½d. for 16 cwt. 3 qrs?
(4) Take $\frac{3}{7}+\frac{4}{9}$ from $3\frac{1}{2}+4\frac{3}{4}$.

B. (1) Find by practice the value of 798¼ yards at £7 16s. 11d.
(2) Make out this bill in proper form:—
6 cwts. coal at 12s. 8d. per ton.
9 carts wood at 17s. 9½d. per cart.
300 trees at 2s. 1d. each.
8 boxes oranges at 12s. 7½d. per box.
(3) If 48 horses eat a quantity of corn in 25 days, how many horses will it feed for 15 days?
(4) Multiply $5\frac{5}{6}+6\frac{5}{7}$ by $1\frac{9}{35}$.

Geography.—Map drawing (1) Spain and Portugal, (2) Italy. (3) Australia. Questions on the coast line of Europe—islands, seas and gulfs, river-mouths. France—its mountains, rivers, and towns. Some general questions on Australia.

History.—The wars and revolutions of the period assigned to Standard V.

Repetition.—See Standard VI.

STANDARD VI.

Reading.—'The Fountain of Beauty,' from Century Reader Book VI., p. 99.

Grammar.—Parsing and analysis from the same lesson.

Writing.—Essay, 'A day on the Moors.'

Arithmetic.—

A. (1) Simplify $\frac{\frac{1}{6}\text{ of }1\frac{1}{4}\text{ of }4\frac{1}{7}}{\frac{5}{16}\text{ of }1\frac{1}{3}\text{ of }3\frac{1}{2}} - \frac{3\frac{1}{4}+4\frac{1}{5}}{6\frac{1}{2}+1\frac{1}{17}}$
(2) Add together $1\frac{1}{8}$ of a guinea, $\frac{5}{8}$ of £1, $\frac{5}{16}$ of 2s. 6d. and $29\frac{1}{2}\frac{5}{6}$ of $7\frac{1}{2}$d.
(3) Find the amount of £3,050 10s. 6d. at 5 per cent. per annum for $3\frac{1}{4}$ years.
(4) If the wages of 54 men for 36 days amount to £60 15s., what will be the wages of 30 men for 32 days?

B. (1) If 27 men mow a field of 90 acres in 7 days working 8 hours a day, how many men will be required to mow 200 acres in 16 days working 10 hours a day?
(2) Reduce 3 acres 3 rds. 30 pls. to the decimal of 7 acres.
(3) Find the interest on £225 13s. 4d. for $2\frac{1}{2}$ years at $4\frac{3}{4}$ per cent. per annum.
(4) Simplify $\frac{3\frac{1}{4}-2\frac{1}{3}}{3\frac{1}{6}+1\frac{1}{2}} \div 1\frac{1}{7}$.

Geography.—Africa—islands, rivers, surface, climate, productions. United States—towns, industries, imports from and exports to Great Britain. Different productions of our colonies.

History.—Questions on wars of Victoria's reign, and territory acquired since 1830. Dates of Repeal of Corn Laws, Catholic Emancipation, Reform Bills, Great Exhibition, Death of Prince Albert, Zulu War, etc. Questions asked about Reform, Emancipation, Repeal, to see if the meaning of these terms were properly understood.

Repetition.—(With Standard V.) 'How Horatius kept the Bridge,' with explanations of meanings and allusions.

Singing.—Standards III., IV., V., VI. Songs in three parts: (1) 'The Auld House.' (2) 'Waiting for the May.'

Modulator.—**d m s d' t s f r s d' m r d, s, fe s l se l t d' s m r l d' d,.**

Ear Exercise.—On Harmonium:—**d m r d ; r s m l ; d' s r d ; r m s t ; l d' t d.'**

Time Test.

| 1 :1 :1 | — :1 :1 .1 | 1 .1 :1 .1 :1 .1 | 1 :— :— ‖

Quarterly Arithmetical Tests.

BY JOSEPH WOLLMAN,

Head Master of the Wellgate Board School, Rotherham.

STANDARD I.—FIRST QUARTER.

1. 17, 504, 8, 36, 291

2. 596 − 326

3. 854 − 413

4. How many are 69 pens and 3 dozen?

SECOND QUARTER.

1. 429, 60, 735, 4, 682

2. 247 × 160

3. 315 ÷ 8

4. Add together 4 times 8, 6 times 9, 5 times 12, 3 times 7, and 6 times 4.

THIRD QUARTER.

1. 5, 978, 16, 359, 7

2. 330 × 33

3. 618 − 579

4. A boy had 60 marbles. He lost 28 and bought 45. How many had he then?

STANDARD II.—FIRST QUARTER.

1. Take fifty-seven thousand and seventy from sixty thousand and five.

2. 478 + 25,094 + 69 + 3,806 + 57,912 + 9,680.

3. 6,798 × 35.

4. What is the difference between 7 times 967 and 9 times 876?

SECOND QUARTER.

1. What is a quarter of twenty-seven thousand six hundred and twenty? Write the answer in words.

2. Find the product of 29,706 and ·608

3. How many less than 36,407 is 8,719?

4. A woman had a thousand eggs. She placed 19 in each of 13 baskets, and 23 in each of 17 baskets. How many had she over?

THIRD QUARTER.

1. Multiply 58,094 by 7,009.

2. Divide 84,678 by eleven.

3. From 70,804 subtract 40,807.

4. If 1,164 nuts be divided among a dozen boys, how many less than a hundred would each boy get?

STANDARD III.—FIRST QUARTER.

1. Divide half a million by 58.

2. If the divisor is 690 and the quotient 7,396, what is the dividend?

3. Find the seven hundred and thirty-sixth part of four million four hundred and one thousand two hundred and eighty.

4. What number multiplied by 98 will give the same product as 9,506 multiplied by 78?

SECOND QUARTER.

1. From seven hundred and eight pounds nineteen shillings and a farthing subtract seventy pounds and ninepence three farthings.

2. £8,709 17s. 11d. + £965 18s. 10¾d. + £47 13s. 9½d. + £8 15s. 8¼d. + 19s. 7¾d. + 6½d.

3. If 5,073 nuts are divided among 57 boys, and 3,626 are divided among 37 girls, how many more does a girl get than a boy?

4. Add 5 half-crowns, 6 florins, 19 sixpences, 57 pence, 38 farthings, and 16s. 7¾d.

THIRD QUARTER.

1. Find the sum of £19,306 14s. 6½d., £6,718 16s. 11d., £590 9s. 7¾d., £82,075 15s. 4½d., £300,649 17s. 8¾d., £5,927 10s. 10¼d., and £34 18s. 9½d.

2. A builder bought two hundred and ninety-four thousand bricks. After half had been sent the rest came in 75 loads. How many were in each load?

3. Find the difference between ninety-nine thousand nine hundred and nineteen pounds eighteen shillings and sevenpence farthing, and a quarter million sovereigns.

4. William deposited £1 15s. 6d. in the bank in January, withdrew 17s. 9d. in February, deposited three guineas in March, withdrew £2 13s. 6d. in April, deposited £3 14s. 8d. in May, and £1 19s. 7d. in June. How much had he then in the bank?

STANDARD IV.—FIRST QUARTER.

1. Multiply seventy-eight pounds and eleven pence farthing by seventy-eight.

2. What is the five hundred and ninth part of £23,258 2s. 4½d.?

3. Find the total cost of the following articles:—9 pounds of sugar at 2½d. per pound; 5 pounds of coffee at 1s. 8d. per pound; 2½ pounds of tea at 1s. 10d. per pound; and 7 pounds of cheese at 9½d. per pound.

4. If 76 articles cost £48 10s., how much should each article be sold for to gain £18 19s.?

SECOND QUARTER.

1. Reduce 16 tons, 17 cwt., 5 stone, 12 lbs., to half-ounces.

2. How many yards at 1s. 6½d. per yard can be bought for £50 8s. 3d.?

3. Bring 3 sq. mls., 239 ac., 28 pls., to sq. yards.

4. A wheel makes 2,640 revolutions in 7 miles. What is its circumference in feet?

THIRD QUARTER.

1. Reduce seven million seventy thousand and seven minutes to years, days, &c.

2. If a man earns £97 10s. in a year, what does he earn in 3 weeks?

3. Find the cost of 359 gls., 3 qts. 1 pint, of milk at 1½d. per pint.

4. A gentleman gave 22½ tons of coal to some poor people, giving each 3 cwt. 3 qrs. How many persons received the gift?

STANDARD V.—FIRST QUARTER.

1. What is the value of 17,905 articles at £107 19s. 5¾d. each?

2. Find the rent of 38 acres, 2 rds., 14 pls., at £19 10s. an acre.

3. If 29½ tons are bought for £37 15s. and sold for £42 3s. 6d., what is the gain on each ton?

4. A bankrupt owes £7,918 5s., and he pays 8s. 10d. in the pound. What is the value of his assets?

SECOND QUARTER.

1. A mason can build a wall in 15 days, working 8 hours a day. How many hours a day must he work to finish it 3 days sooner?

2. How much must be given for 19 lbs., 13 oz., 7 drs., at £59 14s. 8d. per cwt.?

3. If 50 yards of cloth cost £3 8s. 9d., how many yards can be purchased for £4 16s. 3d.?

4. How much change would you get out of a £10 note after paying for the following articles?—

38 table books at 4 for 3d.;
15 atlases at 8s. 6d. per dozen;
7 doz. geographies at 11d. each;
4,500 pencils at 6s. 9d. per thousand;
114 rulers at 10d. per dozen.

THIRD QUARTER.

1. Take $\frac{7}{10}-\frac{7}{12}$ from $\frac{5}{6}-\frac{5}{8}$.

2. If $\frac{3}{7}$ and afterwards $\frac{5}{9}$ is cut from a piece of cloth, what fraction of the whole is left?

3. If a stick 3 ft. 9 in. long standing upright casts a shadow 4 ft. 9 in., how high is a tower which at the same time of the day casts a shadow 85½ feet long?

4. A man bought 1,488 oranges at 9d. per dozen. At what price must he sell them to gain £1 11s.?

STANDARD VI.—FIRST QUARTER.

1. Take $\frac{6\frac{1}{4}}{9\frac{3}{8}}$ from $\frac{5\frac{4}{7}}{5\frac{7}{9}}$.

2. Simplify:— $\frac{4{\cdot}9375\times{\cdot}075}{{\cdot}0015625}$.

3. Divide the product of $3\frac{5}{8}$ and $7\frac{1}{3}$ by the difference of $4\frac{7}{11}$ and $2\frac{1}{12}$.

4. Find the sum of ·5$\dot{6}$, ·3$\dot{2}\dot{4}$, and ·85, and give the answer as a vulgar fraction.

SECOND QUARTER.

1. Reduce 649 square yards to the decimal of an acre.

2. A man owes £1,800 to three creditors, and his property amounts to £1,350. The claims of two of the creditors are £250 and £750. What sum will the third creditor receive?

3. Find the value of $2\frac{3}{5}$ of £2 5s. + ·35 of 7s. 6d. + 2·4 of a guinea ÷ ·08 of £150.

4. Four persons owned a ship. One share was $\frac{1}{5}$, another $\frac{3}{7}$, a third $\frac{1}{10}$, and the fourth was worth £476. What was the value of the ship?

THIRD QUARTER.

1. A person who owes £18,561 15s., can pay only £9,744 18s. 4½d. How much is this in the £?

2. What is the amount of £85 for 10 months at £3 12s. 6d. per cent?

3. Reduce $3\frac{9}{10}$ of 5s. 6d. to the decimal of $6\frac{1}{2}$ guineas.

4. At what rate per cent. will £690 amount to £703 16s. in 6 months?

STANDARD VII.—FIRST QUARTER.

1. Divide ·7$\dot{5}\dot{8}$ by 6·97 to 5 places of decimals.

2. What principal will gain £4 3s. 1½d. in 3 months at $3\frac{1}{2}$ per cent.?

1. A man bought a horse with $\frac{3}{10}$ of his money, and a cow with ·$\dot{3}\dot{7}$ of the remainder. He had £41 6s. 8d. left. How much had he at first?

4. If a man travels $21\frac{3}{8}$ miles in $3\frac{1}{3}$ hours, how far can he go in $2\frac{1}{3}$ hours?

SECOND QUARTER.

1. In what time will £497 10s. amount to £545 17s. 8¼d. at $2\frac{3}{4}$ per cent?

2. A man earned £1 19s. 6d. per week for 37 weeks, and £1 15s. 9d. per week for 8 weeks. He was unable to work the rest of the year. What were his average weekly earnings for the year?

3. What percentage is a penny of (a) a florin (b) half-a-crown?

4. A butcher bought 5 cows at £17 16s. each. What must he give for another cow so that the average for the six will be £17 15s.?

THIRD QUARTER.

1. A person bought £1,750 stock at $98\frac{3}{8}$ and sold it at $103\frac{1}{4}$. Find his gain.

2. I bought 70 yards of cloth for £52 10s. At what price per yard must it be sold to gain 15 per cent.?

3. An income of £712 10s. was derived from investing in the $3\frac{3}{4}$ per cents at $97\frac{5}{8}$. How much was invested, brokerage being $\frac{1}{8}$ per cent.?

4. By selling an article for 8s. 9d. a shopkeeper lost $12\frac{1}{2}$ per cent. What should he have sold it for to lose only $7\frac{1}{2}$ per cent.?

ANSWERS.

STANDARD I.

	First.	Second.	Third.
1.	856.	1,910.	1,365.
2.	270.	87.	297.
3.	441.	307.	39.
4.	105 pens.	191.	77 marbles.

STANDARD II.

	First.	Second.	Third.
1.	2,935.	6,505.	407,180,846.
2.	97,039.	18,061,248.	7,698.
3.	237,930.	27,688.	29,997.
4.	1,135.	362 eggs.	3 nuts.

STANDARD III.

	First.	Second.	Third.
1.	8,620+40.	£638 18s. 2½d.	£415,304 3s. 10½d.
2.	5,103,240.	£9,733 6s. 5½d.	1,960 bricks.
3.	5,980.	9 nuts.	£150,080 1s. 4¾d.
4.	7,566.	£2 16s. 2¼d.	£7 1s. 6d.

STANDARD IV.

	First.	Second.
1.	£6,087 13s. 1½d.	1,210,432 half-ounces.
2.	£45 13s. 10½d.	654 yards.
3.	£1 0s. 4d.	10,450,407 sq. yards.
4.	17s. 9d.	14 feet.

Third.

1. 13 yrs. 164 days, 17 hrs. 27 min.
2. £5 12s. 6d.
3. £17 19s. 10½d.
4. 120 persons.

STANDARD V.—First.

1. £1,933,273 14s. $5\frac{3}{4}$d.
2. £752 9s. 1½d.
3. 3s.
4. £3,497 4s. 6½d.

Second.

1. 10 hours.
2. £10 11s. 7½d.
3. 70 yards.
4. 2s. 4½d.+10s. 7½d.+£3 17s.+£1 10s. 4½d.+7s. 11d.= £6 8s. 3½d. £10−£6 8s. 3½d.=£3 11s. 8½d.

Third.

1. $\frac{11}{12}$s.
2. $\frac{11}{12}$.
3. 67½ feet.
4. 1d.

STANDARD VI.

	First.	Second.	Third
1.	$\frac{3}{5}$s.	·1346.	10s. 6d.
2.	237.	£600.	£87 11s. 4½d.
3.	$10\frac{8}{11}$.	£21 7s. 6d.	·1571428.
4.	$1\frac{19}{110}$.	£17,640.	4 per cent.

STANDARD VII.

	First.	Second.	Third.
1.	·10883....	3½ years.	£85 6s. 3d.
2.	£475.	£1 13s. 7$\frac{1}{11}$d.	17s. 3d.
3	£96.	(a) 4$\frac{1}{2}$%. (b) 3$\frac{1}{2}$%.	£18,572 10s.
4.	15¾ miles.	£17 10s.	9s. 3d.

Contracted Arithmetic.

BY J. L. RICHARDSON.

SECTION XXXI.

Division by Table.

WHERE the same divisor is used for several calculations, and speed is of more account than mental discipline, a considerable saving of time may be effected by constructing a table of each divisor, containing its multiples by the nine primary digits.

In the annexed table any multiple of 37, from 1 to 9, may be instantly seen, and the proper subtrahend at any stage at once written down.

37	
1	= 37
2	= 74
3	= 111
4	= 148
5	= 185
6	= 222
7	= 259
8	= 296
9	= 333

Form tables and work therefrom the following:—

EXERCISE XXXIV.

By 26.	1. 4,876.	2. 3,928,	3. 4,587
	4. 5,293.	5. 7,864.	
By 37.	6. 9,830.	7. 4,765.	8. 9,173.
	9. 7,264.	10. 5,298.	
By 54.	11. 3,579.	12. 2,864.	13. 3,918.
	14. 5,946.	15. 8,123.	
By 73.	16. 48,120.	17. 35,470.	18. 23,596.
	19. 82,459.	20. 38,192.	
By 62.	21. 39,124.	22. 45,163.	23. 78,290
	24. 58,146.	25. 72,458.	

SECTION XXXII.

Deductory Practice.

Though practice is generally supposed to afford an easier and more expeditious mode of solving questions of cost than multiplication, there are few who will not own that this rule imposes a severer strain upon the patience and discernment of a student than almost any other elementary process. By a little forethought, however, in the selection of 'parts,' and by occasionally stepping out of the beaten track, the Exercises may be considerably curtailed.

One of the simplest, yet most neglected ways of doing this is to work on the 'deductory' plan, that is, if the given price closely approach the next higher round number, step at once beyond the given price and adopt that number, deducting the difference instead of working slowly upwards by the incremental process.

For instance, it is easier to reckon the value of 618 articles at £6, and to deduct therefrom the value of 618 at 6d. each, than it is to find the value of 618 at £5 19s. 6d. each, by continuous additions under the 'part' system.

Example:—618 at £5 19s. 6d.

We contrast here the two methods of working the sum just mentioned: (*a*) by means of easy 'parts,' and (*b*) by the deductory mode:—

(*a*)

	£	s.	d.
Of £1, 10s. = ½	618	0	0
„ 5s. = ¼			5
„ 4s. = ⅛	3,090	0	0
	309	0	0
	154	10	0
Of 4s., 6d. = ⅛	123	12	0
	15	9	0
	3,692	11	0 Ans.

(*b*)

£	s.	d.	
618	0	0	cost at £1 each.
		6	
3,708	0	0	„ £6 „
15	9	0	excess (*c*) deducted.
3,692	11	0	Ans.

(*c*)

	£	s.	d.
Of £1, 6d. = $\frac{1}{120}$	618	0	0
Excess	15	9	0

Work the following Exercise by the same method:—

EXERCISE XXXV.

				£	s.	d.	
1.	Value of	346	articles at	4	19	10½	each.
2.	„	258	„	5	19	8	„
3.	„	618	„	1	19	11	„
4.	„	580	„	3	17	6¾	„
5.	„	495	„	2	18	0	„
6.	„	749	„	4	19	0	„
7.	„	918	„	9	19	11¾	„
8.	„	847	„	9	19	10¼	„
9.	„	215	„	8	11	10½	„
10.	„	349	„	4	8	9¾	„
11.	„	493	„	7	17	11½	„
12.	„	439	„	9	18	7	„
13.	„	749	„	6	9	11½	„
14.	„	816	„	19	19	0	„
15.	„	594	„	18	19	8¼	„
16.	„	678	„	29	19	6	„
17.	„	423	„	1	18	7½	„
18.	„	614	„	11	16	4	„
19.	„	582	„	18	10	6	„
20.	„	347	„	29	19	9¾	„

SECTION XXXIII.

Factorial Practice.

Instead of continuing to hunt up additional parts it is often expedient, and perfectly permissible, to multiply the product of those already taken, when the latter forms a factor of the required price. To find the price of, say, 876 articles at 8s. 4d., one of the shortest ways of working by practice would be that under (*a*) wherein we take 5s. and 3s. 4d. as a fourth and sixth respectively of a pound. But we arrive at the same result by a yet shorter route in (*b*), if we take five times 1s. 8d., which is a twelfth of a sovereign and also an aliquot part of 8s. 4d. The advantage would be still more apparent in larger sums.

(*a*)

	£	s.	d.
Of £1, 5s. = ¼	876	0	0
„ 3s. 4d. = ⅙	219	0	0
	146	0	0
	365	0	0

(*b*)

	£	s.	d.
Of £1, 1s. 8d. = $\frac{1}{12}$	876	0	0
	73	0	0
			5
	365	0	0

EXERCISE XXXVI.

Find value of—

1. 368 at 7s. 6d. each.
2. 496 at 8s. 4d. each.
3. 524 at 12s. 6d. each.
4. 839 at 13s. 4d. each.
5. 916 at 15s. each.
6. 1,084 at 16s. each.
7. 9,763 at 16s. 8d. each.
8. 7,348 at 17s. 6d. each.

SECTION XXXIV.

Practice on even numbers of Shillings.

When the price consists of an even number of shillings, the cost may be readily found by multiplying by half the number of shillings, dividing by 10, and doubling any remaining shillings. The reason will be easily understood, if we consider that, to multiply the quantity by the full number of shillings, and afterwards to reduce the latter to pounds, would involve division by 20, which at least requires a line of figures. The same result, however, can be obtained by taking half the number of shillings for a multiplier, and dividing by ten, which would only need the cutting off of the right hand digit for the shillings. As the shillings so found would be only half the real remainder, we double them. Hence the rule.

Example:—8,642 at 16s. each.

The half of 16 = 8. 8,642 × 8 = 69,696.

69,696 ÷ 10 = 6,969 $\frac{6}{10}$, $\frac{6}{10}$ = $\frac{12}{20}$ or 12s.

∴ Ans. £6,969 12s.

EXERCISE XXXVII.

Find value of—

1. 384 at 18s. each.
2. 596 at 12s. each.
3. 740 at 14s. each.
4. 986 at 16s. each.
5. 715 at 12s. each.
6. 918 at 16s. each.
7. 1,046 at 18s. each.
8. 7,460 at 14s. each.

SECTION XXXV.

Greatest Common Measure: Vertical Form.

The modification of G.C.M. work given below, though by no means new, might with advantage be more generally applied by scholars and students, in preference to the usual form which, taking a diagonal course across slate or paper, is not only unsightly in appearance, but wasteful of space. As may be seen it is better to let the calculation take a vertical form, placing the remainder to the left, and the new

dividends where the remainders usually appear. The process may be still further abbreviated by omitting the subtrahends altogether, on the Italian system (Section 30), as in (*b*).

Example:—Required the G.C.M. of 215 and 387.

(*a*)	(*b*)
215)387(1	215)387(1
215	172)215(1
172)215(1	G.C.M. 43)172(4
172	
G.C.M. 43)172)4	
172	

EXERCISE XXXVIII.

Find G.C.M. of—

1. 234 and 342.	2. 270 and 306.
3. 155 and 235.	4. 155 and 5,005.
5. 322 and 483.	6. 423 and 893.
7. 336 and 868.	8. 531 and 711.
9. 371 and 679.	10. 805 and 945.
11. 371 and 583.	12. 786 and 678.
13. 720 and 1,736.	14. 1,400 and 2,121.
15. 918 and 1,928.	16. 384 and 1,296.
17. 6,127 and 8,393.	18. 4,800 and 4,125.
19. 1,984 and 4,832.	20. 1,832 and 1,496.

ANSWERS.

EXERCISE XXXIV.

1. 187 + 14.	2. 151 + 2.	3. 176 + 11.
4. 203 + 15.	5. 302 + 12.	6. 265 + 25.
7. 128 + 29.	8. 247 + 34.	9. 196 + 12.
10. 143 + 7.	11. 66 + 15.	12. 53 + 2.
13. 72 + 30.	14. 110 + 6.	15. 150 + 23.
16. 659 + 13.	17. 485 + 65.	18. 323 + 17.
19. 1,129 + 42	20. 523 + 13.	21. 631 + 2.
22. 728 + 27.	23. 1,262 + 46.	24. 937 + 52.
	25. 1,168 + 42.	

EXERCISE XXXV.

1. £1,727 16s. 9d.	2. £1,543 14s.
3. £1,233 8s. 6d.	4. £2,249 6s. 3d.
5. £1,435 10s.	6. £3,707 11s.
7. £9,179 0s. 10½d.	8. £8,463 16s. 5¾d.
9. £1,847 13s. 1½d.	10. £1,549 15s. 6¾d.
11. £3,893 13s. 5¼d.	12. £4,358 18s. 1d.
13. £4,866 18s. 9¾d.	14. £16,279 4s.
15. £11,276 14s. 4½d.	16. £20,323 1s.
17. £816 18s. 4½d.	18. £7,255 8s. 8d.
19. £10,781 11s.	20. £10,406 14s. 11¼d.

EXERCISE XXXVI.

1. £138.	2. £206 13s. 4d.	3. £327 10s.
4. £559 6s. 8d.	5. £687.	6. £867 4s.
7. £8,135 16s. 8d.		8. £6,429 10s.

EXERCISE XXXVII.

1. £345 12s.	2. £357 12s.	3. £518.
4. £788 16s.	5. £429.	6. £734 8s.
7. £941 8s.		8. £5,222.

EXERCISE XXXVIII.

1. 18.	2. 18.	3. 5.	4. 5.	5. 161.
6. 47.	7. 28.	8. 9.	9. 7.	10. 35.
11. 53.	12. 6.	13. 8.	14. 7.	15. 2.
16. 48.	17. 11.	18. 75.	19. 32.	20. 8.

(To be continued.)

Our Certificate Class.

BY DR. GEORGE BEACH, M.A.

Co-author of 'Our Mother Tongue,' &c.,

Head Master of Christ Church Schools, Macclesfield.

GENERAL REMARKS.

1. Our Routines are this month discontinued in order that plenty of time may be given for revision or the wiping off of arrears of work. The whole course both for Males and Females has been mapped out in detail and the salient parts indicated.

2. In consequence of numerous entreaties, prompted by a lack of any suitable publication, we devote considerable space this month to—(1) a short account of Lord Tennyson; (2) a brief critique of his poetical ability, and (3) curt notes, mostly etymological, upon Lancelot and Elaine.

3. Male students will do well to study the higher parts of Algebra; Female students, Domestic Economy; and all students, Music.

These are the portions that space has not permitted to be dealt so fully with as could have been desired. Nevertheless, the 'failing subjects' must occupy first place.

4. Our candidates should bear in mind this most important alteration of the New Code, viz., 'That candidates placed hereafter in the Third Division will not be allowed to take charge of Pupil-Teachers.'

5. The Examination for Certificates will commence on Monday, the 15th of December, 1890, at 3 p.m.

6. In this issue and December's we shall give (with Answers to the Mathematics) a complete set of Examination Papers, composed almost entirely of Government Questions. As they will be 'the actual thing,' candidates will be able to form a good estimate of their capabilities and chances.

A FEW REMARKS ON TENNYSON.

On the 5th of August, 1809, at the little village of Somerby, in Lincolnshire, Alfred Tennyson first saw the light. His father, Dr. George Tennyson, was the rector, and his mother, Elizabeth, *née* Fytche, was daughter of the vicar of Louth.

Alfred was the third son, and, in addition, there were four younger brothers. The second son, Charles, was Alfred's favourite companion, and most of their steps up the ladders of education and poesy were taken together.

The youth of these two brothers was passed at Louth Grammar School, but they appear to have profited more by the home sojourning than by tuition.

Neither Charles nor Alfred were famous for formal attainments, but rather for general literary knowledge; and a love of nature, a hatred of meanness, a refinement of imagination, and a deepening of religious reverence were sedulously developed by their parents.

In 1827 they ventured upon publishing a little volume containing 102 poems, but as none of these appear in any edition of the Laureate's works, not even under the title 'Juvenilia,' we cannot accurately determine which were the sole work of Alfred.

Two years later, the brothers entered Trinity College, Cambridge, whither they had been preceded the previous year by Arthur Hallam, the son of the great historian. Between these rare natures a friendship unterminated by death sprang into bloom and materially influenced our poet's life and career. More than four years it ripened, and then Hallam died.

In 1829 Tennyson won the Chancellor's gold medal for a poem written in blank verse, entitled *Timbuctoo*. This distinction was unique, as hitherto no poem of the kind had been successful. During the next four years were issued many lyrical productions, of which the chief were *Mariana*, *The Lady of Shallott*, *The Miller's Daughter*, *The May Queen*, *The Death of the Old Year*, etc.

After Hallam's death, Tennyson was too greatly smitten either to sing or study, except in private; and he left Cambridge without taking a degree, and remained mute for ten years.

This time was chiefly spent in crystallising sorrow into poetry, and in revising his old productions—in struggles with poverty at Hampstead and the Temple, varied by occasional residences with his uncle at Caistor—in combating religious doubt and reconciling religious confusion.

Yet at times he was to be found at the old Cock Tavern near Temple Bar, in the society of Carlyle and other intellectual relatives.

At last, in 1842, he broke silence with an edition of two volumes, the latter of which was composed almost entirely of new pieces.

In it we find *Locksley Hall*, *The Vision of Sin*, *Lady Godiva*, *Lady Clare*, etc.

The then Laureate, Wordsworth, was introduced to him the following year at the house of Tennyson's publisher, Moxon.

Two years later the poet's career was brightened by a grant of a State annuity of £200 per annum, bestowed through the instrumentality of Sir Robert Peel.

The Princess: a Medley, was issued in 1847, but did not reach its final form until 1853, when five successive editions had furnished opportunities for elaboration and enlargement.

Three years before its final issue (1850) Tennyson's fortune culminated, for he anonymously published *In Memoriam* (a poem sanctified to his friend Hallam)—was appointed Poet Laureate in succession to Wordsworth, who had departed full of years—and he was married to Emily Selwood, eldest daughter of Mr. Henry Selwood, of Horncastle.

It is worthy of note that his faithful brother, Charles, also married a Miss Selwood.

From the time of his marriage, blessed with wife and children, Tennyson withdrew more and more from 'society' functions, having purchased the estate of Farringford, in the Isle of Wight, and finding a fuller life in domestic happiness and poetical outpourings.

Our space will not permit us to notice *seriatim* the onward course of the poet's activity. We can simply mention that from 1855 to 1859 Tennyson was busy planning and preparing his famous Arthurian poems, *The Idylls of the King*, which were published in the latter year.

Lancelot and Elaine (the one with which we are mostly concerned) is the sixth in this series of eleven, and is one of the most charmingly pathetic of the whole, and forms a graceful interlude in the passage of the story.

TENNYSON AS A POET.

At the risk of conventionality we must rank Tennyson among our greatest poets, excluding always the unapproachable Shakespeare and Milton.

In originality he has a style and a realm all his own, neither is he lacking in range. His verses have a melodious and tuneful clearness of flow, not to be matched even by Pope, and which are unvitiated by this poet's formal regularity.

His strains have all the polish of Gray, all the piety of Herbert, all the amorousness of Lovelace, all the descriptive power of Spenser, the imagination of Shelley, and the mysticism of Coleridge.

He can range the human mind with introspective view—can by self-experience depict the progress from doubt to hope, and from hope to faith—can display with more fascinating grace the earnestness of Carlyle contemplating the infinities—and can almost solidify into tangibility the transfigured visions of an age long past. Nevertheless, Tennyson will never be so popular as Longfellow, nor even as Mackay. None but a Tennyson can rightly comprehend him at times. To the ordinary mind the familiarity of Wordsworth, the passion of Byron, the narrative of Scott, and the vigour of Dryden, will appeal quite as strongly; and we cannot help feeling that in historic efforts not inspired by patriotic fervour, and in his dramatic attempts, he occasionally falls very low indeed.

Tennyson attains to stateliness, but falls short of majesty; he is deeply pathetic, but not grandly passionate; and if we except his love songs, he is greater in depicting emotion than in expressing it.

Yet his writings will survive as long as the country that he loves, and the language which he has adorned.

LANCELOT AND ELAINE.

A Few Brief Notes.

Soilure (Fr. soillure); *devices* (Fr. dévise) = heraldic emblems; *blazoned* (A.-S. blaese = a flame, a splendour) = portrayed armorial bearings in their proper colour; *tinct* (Old Fr. tinct) = a slight colouring distinct from the ground colour; *wit* (A.-S. witt = understanding) = wise taste and skill; *yellow-throated*. The downy feathers of half-fledged birds is often tawny. This may be noted even in chickens; *fantasy* (Gr. and L. phantasia) = fanciful design; in line 27 it means 'fancy'; *to tilt* (A.-S. tealtian = to totter), to ride at each other with blunt lances; *joust* (Old Fr. jouster = to tilt); *lichened* (L. lichen = rock moss); *nape* (A.-S. cnaep = the top) = the back of the neck; *scaur* = scar, a bare, shingly mountain side; *the heathen* = the Saxon; *boon* (A.-S. ben = a prayer) = a prayer granted, a free gift; *prowess* (Fr. prouesse from L. prodesse), valorous deeds; *tale* = complete number, c.f. 'to tell one's beads'; *lists* (It. lista = a border) = enclosure for the jousts; *lets* = hinders, c.f. Prayer Book 'sore let and hindered'; *myriad* (Gr. murias-ados) = 10,000, countless; *aught* (A.-S. a-wiht) = anything; *devoir* (Fr.) = duty; *vermin* (L. vermis = a worm), c.f. lines 105 and 106; *craft* (A.-S. craeft = skill), the meaning has depreciated into 'cunning'; *thoroughfare* (A.-S. thurh = through, fatan = to go) = main road; *wot*, the pt. of wit = to know; *allow* = excuse; lustihood (Ger. lustig) = vigour; *belike* = probably; *an if*, a double conjunction, *an* = if; *be* = old form for 'are'; *simple* = plain, lowly; *mellow* (A.-S. melewe = ripely soft); *lineaments* (L. lineamentum, from linea = a line) = lines of countenance; *fiend* (A.-S. feond = a malicious foe) = devil; *kindly* (A.-S. cyn = family, from 'cennan,' to beget, related to old Welsh 'cun') = benevolent; *kind* (A.-S. cyn) = species; *glanced* = alluded to; *passion* (L. patior) = warm feeling; *cuirass* (Fr. cuir = leather) = breast and back-plate; *White Horse*, on the Saxon banner was depicted a white horse; *rath* (A.-S. rathe, or hrathe) = early; *anon* (A.-S. on an = in one [moment]) = soon; *flatt'ring* = caressing; *favour* = a lady-given token worn by a knight at a joust; *tourney* (It. torno = a turn), at a tournament the knights charged in passing and then turned at the bounds of the lists; *wont* (A.-S. wunnian = to continue), custom; *hermit* (Gr. eremos = deserted), an anchorite; *aspen* = a kind of poplar, very susceptible to a breath of air; *broke fast*, c.f. breakfast; *liege* (L. ligius = the feudal tie), sovereign; *dread* (A.-S. draed = to fear), revered, awful; *crescent* (L. crescens = growing); *overcome* = surpass; *either* = each = both; *afield* = on field = at a distance, c.f. 'on board'; *bode* (A.-S. bidan = to wait); *kith* (A.-S. cuth) = acquaintances, often wrongly used for 'kin;' *overdo*, c.f. line 446; *versatility* (L. versatilis = easily turnable) = adaptability; *couched their spears* = put their lances in rest; *pricked*, c.f. 'A gentle knight was pricking o'er the plain' (Spenser); *worshipfully* (A.-S. weorthscipe = worthiness) = honourably; *his*, note the old demonstrative and prenominal force = of *that man*; *Hence will I*, the verb of motion is omitted, a Shakespearian usage; *me* = dative of interest; *pure* = mere; *tilt the lists*, prepositions are often omitted after verbs of motion, c.f. 'Ere he arrive the happy isle' (Milton), and 'Ere he could arrive the point proposed' (Shakespeare); *sore* = much; *needs* is a genitive = of necessity; *quest* (Old Fr. queste from L. quæsitum

= to look for); *ye* = thou, an unaccustomed use; *restless* = scintillating; *therewithal* = notwithstanding that; *tarriance* = tarrying (French form, from L. tardare = to delay); *lieu* (Fr. lieu, L. locus = a place); *dallying* (Ger. dallen = to trifle) = trifling; *fine* = subtle, paltry; *sallying* (Fr. saillie, L. salire = leaping); *ramp in the field* = to stand erect on the surface; *God's death*, often corrupted to 'sdeath = Christ's death; *enow*, really the plural of A.-S. 'genosh' = enough; *strokes of the blood* = pulsations; *fain* (Fr. faim, hunger), vehemently desirous; *rendered* = sculptured; *far blood* = distant relatives; *casque* (Sp. casco = a helmet); *weirdly* (A.-S. wyrd = fate), mystically, uncouthly; *simples* = medicine composed of a single herb, etc.; *quit* (L. quietus = rest) = requite; *tact* (L. tactus = touch), feeling; *scaled* (L. scala = a ladder) = rose by degrees; *let me hence*, see line 505; *ghostly man* = the priest; *shrive* (A.-S. scrifan = to enjoin) = to absolve after confession; *dole* (L. dolor), great grief; *oriel* (Old Fr. oriel = a gallery, L. os-oris = a mouth) = a recessed window; *with Amen*, with acquiescence; *haggard* (Ger. hag = a wood), lean, gaunt; *or...or* = either...or; *tier* (Old Fr. tiere = rank, order) = rank, step; *peerless* (Fr. pair, L. par = equal) = matchless; *heavy* in mind; *joyance*, c.f. 'dalliance,' 'tarriance,' etc.; *worship* = good repute, see line 489; *gorgeous* (Norm. Fr. gorgias) = splendid; *obsequies* (L. obsequium) = funeral rites; *affiance* (L. ad = to, fido = I trust), c.f. Prayer Book 'that she may evermore have affiance in Thee; *inrunning* = confluence; *cove* (L. cavus = hollow, Port. cova = a nook) = recess; *blet* = speck; *mere* (L. mare, Fr. mer) = lake.

ABBREVIATIONS.—A.-S. = Anglo-Saxon, G. = Greek, Gr. = German, L. = Latin, F. = French, It. = Italian, S. = Spanish.

(THREE *hours allowed for this Paper.*)

1. Define logarithm, mantissa, characteristic. Why are results obtained by the use of logarithms generally approximate only? Prove that $\log_a c = \log_a b \times \log_b c$.

2. What is the value of $\frac{a+b}{a+\sqrt{(a+b)}} + \frac{a-b}{a-\sqrt{(a-b)}}$ when $a = 1$ and $b = \frac{\sqrt{3a}}{2a}$. Ans. 1.

3. (*a*) Find the amount of £P in *n* years at *r* per cent. per annum compound interest, if interest be due *q* times a year.

Ans. $P\left(1+\frac{r}{q}\right)^{qn}$.

(*b*) A man whose income is £900 a year insures his life at the rate of £3 10s. for £100, to such an amount that at his death his heir may receive a sum whose interest at 4 per cent. per annum is equal to the man's reduced income. What annual premium must he pay? Ans. £420.

4. A broker bought some shares for £480; he reserved four and sold the remainder for £374, gaining £2 per share on their cost price. How many shares did he buy? Ans. 15.

5. What is the co-efficient of x in the expansion of $\left(x^2+\frac{2^2}{x}\right)^5$?

Ans. $10y^3$.

6. A committee is to consist of four Irish and three Scotch members. If there be 16 Irish and 12 Scotch members eligible, how many different committees could be formed?

Ans. 200,200.

CERTIFICATE EXAMINATION—CHRISTMAS, 1890.

Before beginning your answers, fill up the following Table.
You will do this although you may not answer any part of the Paper, in which case you will return it to the Inspector, after writing the words 'not attempted' in large letters below.

The Name of the Institution at which you are now being examined.	Your Name IN FULL (the *Surname first*), and your age on your last birthday.	Do you attend this Examination as— 1. A resident Student, and *of which year?* 2. A Teacher to be examined for a Certificate, and *from what School?*

A Notice to the following effect is issued to Candidates as to copying and clandestine assistance:—
Candidates who are detected—
(*a*) Introducing into the examination room, or having about them, any book or writing, whether any one uses it or not, from which answers may be copied—
(*b*) Applying, under any circumstances whatever, to other candidates—
(*c*) Copying, under any circumstances whatever, one from another—or
(*d*) Conniving at any misconduct of this kind—
will be dismissed from the Examination, and will be suspended for a period not exceeding three years from all recognition by the Committee of Council. The plea of accident or forgetfulness will not be received.

Candidates must leave the blotting-paper. and paper for making rough drafts, which are supplied by the Inspector, on their desks at the end of each sitting, and must bring none other into the room. The use of blotting-paper for rough drafts, or for any writing whatever, is strictly forbidden.

Candidates may not bring into the examination room any instrument or material for writing, except *pens*, *ink*, *pencil*, *knife*, and *india-rubber*.

Whatever questions Candidates may have to ask, or remarks to make, during the Examination, must be addressed to the Inspector only.

Male Candidates.

SECOND YEAR.

Algebra, Mensuration and Arithmetic.

Candidates are not permitted to answer more than NINE questions in Algebra and TWO in Mensuration.

Candidates who have not passed with credit in Arithmetic in one of the two immediately preceding years must answer THREE of the FOUR questions on Arithmetic instead of those on Mensuration.

The solution must be given at such length as to be intelligible to the examiner, otherwise the answer will be considered of no value.

7. (*a*) Show that $a^{\frac{1}{n}} \times b^{\frac{1}{n}} = (ab)^{\frac{1}{n}}$. What does a^0 denote?
(*b*) Find the square root of $(x + x^{-1}) - 2(x^{\frac{1}{2}} - x^{-\frac{1}{2}}) - 1$.

Ans. $x^{\frac{1}{2}} - x^{-\frac{1}{2}} - 1$.

8. Solve the equations—
(*a*) $x^4 + 5 - 2\sqrt{x^2 - 2} = 5x^2$.

Ans. $x = \pm\sqrt{\frac{1}{2}(7 \pm \sqrt{5})}$.

(*b*) $\begin{cases} 2x^2 + 3y^2 - xy = 31 \\ x - y = 3 \end{cases}$

Ans. $x = 4$ or $-\frac{1}{2}$; $y = 1$ or $-\frac{1}{2}$.

9. A vessel can be filled with water by two pipes. By one of these pipes alone it would be filled two hours sooner than by the other. Also the vessel can be filled by both pipes running together in $1\frac{7}{8}$ hours. Find the time which each pipe alone would take to fill the vessel. Ans. 5 hours and 3 hours.

10. (*a*) In the expansion of $(1 + x)^n$ the co-efficients of terms equally distant from the beginning and end are the same when the index is a positive integer.

(*b*) Show that in the same expansion the sum of the even co-efficients is equal to the sum of the odd co-efficients.

11. Find the sum of n terms of the series $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \ldots$

Ans. $1 - \frac{1}{n+1}$.

When n is infinite what will the answer be? Ans. 1.

Mensuration.

($\pi = 3\frac{1}{7}$.)

(For those candidates only who have passed with credit in Arithmetic in one of the two immediately preceding years.)

1. If a gas-pipe be 5 yards long and has a bore of 4 inches, what is the area of its surface? Ans. $15\frac{5}{7}$ sq. ft.

2. Find the radius of a sphere which has the same surface as that of a cone 3 inches in radius and 3 in. high. Ans. $\frac{3}{4}\sqrt{2}$.

3. By reducing the side of a cube 2 inches, another cube is formed whose volume is 296 cubic inches less than that of the original cube; find the side of the first cube. Ans. 8 inches.

Arithmetic.

(For those Candidates only who have NOT passed with credit in any one of the two immediately preceding years.)

1. Express 3·28 of $\frac{\cdot 005}{2\cdot 16 \text{ of } 2\cdot 22}$ of $\frac{5\frac{1}{4} \times \cdot 14}{2\cdot 25 \times \cdot 13}$ of £8 8s. 9d. in decimal terms of 4s. $4\frac{1}{2}$d. Ans. ·4.

2. Find the cube root of 483·736625. Ans. 7·85.

3. If I invest in Dock Shares paying £7 per share, when the £100 share is at $122\frac{1}{2}$, I find that I get £35 10s. a year more than if I invest it in $5\frac{1}{4}$ India bonds at 105. What is my capital invested? Ans. £4,970.

4. A herd of 125 cattle is sold for £2,575. There were half as many oxen again as there were cows, and the oxen fetched altogether £25 more than the cows. What was the price of each ox and of each cow? Ans. £17 6s. 8d.; £25 10s. 0d.

Female Candidates.

SECOND YEAR.

(TWO *hours and a* HALF *allowed for this paper.*)

No Candidate is permitted to answer more than TEN questions.

The solution must be given at such length as to be intelligible to the Examiner, otherwise the answer will be considered of no value.

1. What explanations and exercises in involution would you think it necessary to give before teaching a class the rule for the extraction of Square Root? Find the Square Root of 74,529 and explain the process. Ans. 273.

2. A man's capital increased by 20 per cent. every year. At the end of four years it was £5,184. What was his original capital? Ans. £2,500.

3. Explain the difference between True Discount and Bankers' Discount. What is the rule for finding the discount? Explain the reason of it.

4. What decimal of £1 is ·15625 of a guinea *minus* ·625 of a shilling? Ans. ·1328125.

5. A ship leaves port with sufficient provisions to last 14 weeks; 6 of the crew absconded upon setting sail, and the voyage lasted 16 weeks, at the end of which time the provisions just were exhausted. Find the number of the full crew.

Ans. 48 men.

6. How much stock must I sell out of the Three per Cents. at $99\frac{1}{2}$ to purchase £1,584 stock in the Four per Cents. at $126\frac{1}{4}$, the usual brokerage being charged on each transaction?

Ans. £2,030.

7. Subtract the square of 4·5 from the square root of $639\frac{1}{16}$.

Ans. $5\frac{3}{4}$.

8. Express in words the arithmetical truths embodied in these formulæ:—

If a be greater than b, then $\frac{a+1}{b+1}$ is less than $\frac{a}{b}$; but if a be less than b, then $\frac{a+1}{b+1}$ is greater than $\frac{a}{b}$, but less than $\frac{a-1}{b-1}$.

Give a demonstration by means of numbers, such as would be helpful to a class in understanding fractions.

9. What sum must I have invested in the Three-and-a-Half per Cents. at 91 if, after investing £4,000 in the Three per Cents. at 75, and paying an income tax of 7d. in the pound on my total gross receipts, I find my net income to be £524 5s.?

Ans. £9,880.

10. A sum of £38 4s. is made up of half-sovereigns, half-crowns, and threepenny pieces. There are twice as many half-crowns as half-sovereigns, and the number of half-sovereigns bears to the number of threepenny pieces the ratio of 3 to 11. How many are there of each coin? Ans. 48, 96, 176.

11. Find the cost of carpeting a room 15 ft. 4 ins. by 10 ft. 6 ins. with carpet 2 ft. 4 ins. wide, at 3s. 6d. per yard?

Ans. £4 0s. 6d.

12. A, B and C jointly own an estate, their share being in the ratio of 4, $2\frac{1}{2}$ and $1\frac{1}{2}$. A sells half his share to C, and C sells 100 acres to B. The shares of B and C are then equal. Find the number of acres in the original shares.

Ans. 800, 500, 300.

13. A man walks 5 miles the first hour; he then rests for 15 minutes. Then he walks at 4 miles per hour for $1\frac{3}{4}$ hours, but after that only walks 6 miles in 2 hours. What is his average pace, counting the stop? Ans. $3\frac{3}{4}$ miles per hour.

14. The difference between the discount and interest of a certain sum of money for three months, interest calculated at 4 per cent., is 1s. Find the principal. Ans. £505.

15. 'The Double Rule of Three is a shorter method of working out such questions as would require two or more applications of the Rule of Three.' Exemplify this statement.

Euclid.

(*Not more than* EIGHT *questions may be answered.*)

N.B.—Capital letters (excluding A B C D E F), not numbers, must be used in the diagrams. All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operations*, such as −, +, ×, PQ^2, PQ.RS.

1. Construct a triangle whose sides are equal to three given straight lines, any two of which are together greater than the third.

Show by diagrams what will happen if you attempt to construct triangles whose sides contain units in the following relations—(*a*) 2, 3, 4; (*b*) 2, 3, 5; (*c*) 2, 3, 6.

2. To describe a square on a given straight line.

From LN, the diagonal of a square LMNR, cut off LS equal to one fourth of LN, and join SN, SR. Show that the figure MLRS equals twice the square on LS.

3. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts together with twice the rectangle contained by these parts. If from one of the equal angles of an isosceles triangle a perpendicular be dropped on the opposite side, the square on that perpendicular is equal to the square on the line intercepted between it and the other equal angle, together with twice the rectangle contained by the segments of the side.

4. If a straight line drawn through the centre of a circle bisect a straight line in it which does not pass through the centre, it shall cut it at right angles; and conversely, if it cut it at right angles, it shall bisect it.

PQ and SR are two equal chords of a circle of which O is the centre; prove that the line joining O to the point of intersection of these chords bisects the angle between them.

5. To find the centre of a given circle.

To construct a circle of given radius which shall pass through two given points.

6. If a straight line touch a circle, the straight line drawn from the centre to the point of contact shall be perpendicular to the line touching the circle.

A circle is drawn with one extremity of the base of an isosceles triangle as centre, and half the base as radius; show that the line joining the vertex to the middle point of the base touches the circle.

7. If a straight line touch a circle, and from the point of contact a straight line be drawn cutting the circle, the angles which this line makes with the line touching the circle shall be equal to the angles which are in the alternate segments of the circle.

ABC is an equilateral triangle, D, E, F the bisections of its sides; show that DF touches the circle which passes through CDE.

8. If two straight lines cut one another within a circle, one of which passes through the centre and cuts the other at right angles, the rectangle contained by the segments of the one shall be equal to the rectangle contained by the segments of the other.

Two circles ABC, DBC intersect in B and C. Chords AOF, DOE are drawn in each circle through O, a point in the common chord BC; show that the angle EAF is equal to the angle FDE.

9. To inscribe a circle in a given triangle.

M is the centre of the circle inscribed in the triangle PQR, and N is the centre of the circle which touches PQ and PR produced and QR. Show that MN is the diameter of a circle which passes through Q and R.

10. To describe an equilateral and equi-angular quindecagon about a given circle.

Find the ratio of one of its angles to a right angle.

11. If a straight line be drawn parallel to one of the sides of a triangle, it shall cut the other sides or those produced proportionally; and conversely, if the sides or the sides produced be cut proportionally, the straight line which joins the point of section shall be parallel to the remaining side of the triangle.

If the side PQ of the triangle PQR be bisected at S, and the angles RSP and RSQ be bisected by ST, SV meeting PQ, QR in T, V respectively, TV shall be parallel to PQ.

12. To find a mean proportional between two given straight lines.

From a point P outside a circle a line is drawn cutting the circle at Q and R. Find a mean proportional between PQ and PR.

Domestic Economy.

(Three hours allowed for this paper.)

No Candidate is allowed to answer more than EIGHT questions.

1. Compare the values of beef, mutton, veal, poultry, and fish under the heads of nutrition and economy.

2. Explain these terms—*phosphate*, *cereal*, *albumen*, *leguminous*, *fibrin* and *casein*, and give examples of their use.

3. Give some simple rules for the management of a school savings bank. Should it be permissible to use the bank for the savings of the parents? If not, why not?

4. It is said that for a sound system of house drainage attention is especially needed to (*a*) *disconnection*, (*b*) *ventilation*, and (*c*) *trapping*. Explain, using simple diagrams if necessary, the nature and importance of these three points.

5. What precautions have been taken in this country to prevent the introduction of cholera? Explain them as to a Fourth Standard.

6. Describe some investments likely to suit a schoolmistress. Stating the amount of her income, show how it may be most profitably expended.

7. Draw out the Notes of a Lesson to a first class on the public facilities now offered for the investing of small sums; OR on the principles, working, and advantages of co-operative stores.

8. Describe the interior of a laundry room, and the different vessels and implements needed for washing clothes.

9. Mention the ordinary causes of the beginning of fevers, and explain the practice of '*isolating*' infectious cases.

10. Why are lime-washed walls healthier than those covered with paper, and how is lime-washing done?

11. If you allot four hours a week to the teaching of needlework to girls, say how the time is best distributed—whether in four separate lessons of an hour each, or two of two hours each, or otherwise. Say what plan you intend to adopt, and why.

12. Describe the process of vaccination, and name some of the objections to compulsory vaccination frequently raised by ill-advised persons.

School Management.

SECOND YEAR.

Male and Female Candidates.

(Three hours allowed for this paper.)

N.B.—Question 1 (on school registers) *must not be omitted by any Candidate.* Not more than EIGHT questions may be answered.

1. (*a*) In the class registers how will you ensure the *correctness* of (i.) the number entered at every meeting at the foot of the attendance columns? (ii.) of the total attendances of the week and of the quarter?

How would you deal with the registration of scholars who came too late to be marked in the register? How would you mark holidays and days devoted to examinations in religious knowledge?

(*b*) (i.) If the school attendance is irregular, describe in what form you could from the registers draw up a statement to place this irregularity in a striking light? (ii.) How do you find the average number of times attended per week by each child present at all? Of what use is this number? (iii.) How would you record *punctual* attendance? (iv.) How would you write up the daily attendance in view of the school?

2. What processes of thought are required for accurate classification? Say what subjects of school instruction furnish the best discipline in classifying objects, whether mental or physical?

3. Explain each of these technical terms, and give an illustration of its use:—*syllogism*, *inference*, *fallacy*, *proof*.

4. Give a specimen of the sort of blackboard sketch which would be suitable for a lesson on (*a*) the preposition, (*b*) an earthquake, (*c*) Magna Charta.

5. Draw up a time table for a week for the highest form of a school, in which two 'class-subjects' are taken, specifying at the foot your reasons for assigning to the closing hour of morning and evening school the special lessons you have selected for those hours.

6. What assistance does a head-teacher require in conducting a 'mixed school' of 80 boys and girls and 55 infants? State in detail the duties which should be assigned to each, and the part of the work which should be reserved for the head-teacher.

7. What is meant by '*habit*'? By what means is '*habit*' formed and strengthened? Are there any youthful *habits* either of thought or of action which lie especially within the control of the school teacher?

8. What is meant by 'Induction'? Sketch out a lesson in which the inductive method is employed, taking *one* of these subjects:—(*a*) passive verbs, (*b*) the properties of water, (*c*) climate.

9. Name the different purposes which should be kept in view in the teaching of Geography, and say by what means they can be best attained.

10. What do you understand by a well-ventilated room? Explain with diagrams some effective form of window ventilation for a class room. Give an estimate of the amount of fresh air required by each person.

11. In what various ways may children be rewarded for good conduct and proficiency in their studies? Say what kind of rewards appear to you the most legitimate, and what kinds are open to objection.

12. What are Mr. Spencer's remarks upon the teaching of Drawing? Criticise them.

13. Explain the terms *intension* and *extension* as applied to terms in Logic. Distinguish between *genus* and *species*, illustrating your explanation by the terms *cart*, *eagle*, *man*.

14. According to Mr. Spencer, Science is poetic, religious, and disciplinary. How?

Male Candidate.

FIRST AND SECOND YEARS.

Geography.

(Two hours and a half allowed for this paper.)

Candidates may answer only THREE of the first FIVE and THREE of the last FOUR questions, and question No. 6.

Small sketch maps or diagrams may be drawn to illustrate any answer at the candidates' discretion.

1. 'The earth is borne along in the heavens by various movements far more numerous and peculiar than most people would be inclined to suppose.'

Which of these movements would you describe to children?

Give reasons why each of those which you mention should be included in geography for children.

Mention other movements and state why you would not include them in geography for children.

2. Explain the terms constant winds, periodic winds, local winds, giving examples. What are spring tides?

At Batsha the tidal waves come in by two distinct channels, such that the time of arrival of the one is six hours later than of the other. How will the tide there be affected?

3. Give some reasons (with brief explanations) why isothermal lines do not coincide with parallels of latitude. Does it follow that two places which have the same average yearly temperature have also the same climate?

4. Explain the terms *in italics* in the following passage:—'In the year 1886 there was a *total eclipse* of the sun on August 29th, invisible at Greenwich. It began at 10h. 19m. a.m. (*Greenwich mean time*) in *long.* 66° 24′ *W.*, and *lat.* 11° 55′ N. The *central eclipse* began at 11h. 14m. a.m. in long. 79° 46′. W. and lat. 9° 48′ N.'

What part of the British Empire would be a favourable position for observing this eclipse? What is the object of sending out an 'eclipse expedition'?

5. How is the distribution of plants and animals connected with the distribution of land and water in past ages? Give facts.

6. Draw a sketch map—

(*a*) of the River Ganges, *or*

(*b*) of New Zealand, *or*

(*c*) of the East and South coasts of Ireland.

7. The first Settlements of the English in India were at Surat, Fort St. George and Bombay. The first provinces conquered were Bengal, Behar, and Orissa; say briefly what you know about each of these towns and divisions.

8. Name the West African Settlements with their chief articles of export, and describe the position of the recent German colonisation on the West Coast of Africa; *or*

Describe the physical features of the colony of Victoria. What steps towards federation have been taken by the Australian Colonies?

9. Name the wars in which Gibraltar, Quebec, the Mauritius, Cape Colony and Trinidad were added to the possessions of Great Britain. Describe the position of the three first-named.

10. Enumerate the eight provinces included under the name of the Dominion of Canada, and name the chief means of communication by land and water between the western districts and the eastern sea-board.

Female Candidates.

SECOND YEAR.

No candidate is permitted to answer more than SEVEN questions, of which the first question must be one.

(*Three hours allowed for this Paper.*)

Questions 1, 2, 3, 4, 5 are the same as Questions 6, 7, 8, 9, 10, for Males.

6. What would probably be the respective occupations of settlers in Natal, Ceylon and British Columbia?

7. Describe the West Indian Islands which belong to the English, their importance, relative position, production and present condition. Illustrate your answer by means of a small sketch map.

8. Describe the mountain and river systems of the Canadian Dominion, and compare the climate of the south of Canada with that of England.

9. Describe fully the boundaries and physical features of Cape Colony.

10. Classify the British Possessions in the four quarters of the globe in relation to the nature of their political connection with the mother country. Explain the machinery of government in each class.

11. Describe the exact position, and in a very few words mention anything notable about eight of the following places:—Ottawa, Londonderry, Ballarat, New Westminster, Nelson, Trinidad, Pretoria, the Trossachs, Freetown, Simla, Swansea, Demerara.

12. Give short notes of a lesson on the peculiarities of animal and vegetable life to be found in Australia.

CORRESPONDENCE.

1. *We shall be pleased to reply briefly and through this column to any seeking information or advice. Endorse* 'CERTIFICATE EDITOR' *if the office be communicated with.*

2. *Replies demanding urgency will be promptly forwarded per post on receipt of stamped and directed envelope. This privilege does not extend to furnishing solutions and answers to examination questions. A post will be saved by addressing direct to Macclesfield. Upwards of one hundred letters were thus answered during 1889.*

3. *Any suggestions tending to the greater utility and interest of these articles, or to the greater convenience of* 'COACH' *or* PUPIL, *will be thankfully received and thoughtfully considered.*

4. R. T. (Leominster).—You will be allowed to repeat the same selections.

JOE (Edinburgh).—Many thanks for your kind letter. We have heard the same from Aberdeen.

SCHOLARSHIP (Crewe).—Our list of books in the March number will suffice. McLeod's Constitutional History, Moffatt's New Geography.

E. R. (Gloucester).—Only as many as you can thoroughly master.

L. S. (Belfast).—See answer to 'SCHOLARSHIP.'

ULRICA (Heaton Chapel).—We will meet your wishes if space permit, but we cannot promise. You will find what you want about Tennyson in this month's article.

Your certificates will be worth *something*, but the Department won't divulge how much.

5. L. H. (Burnley), CEL. (Market Rasen), G. F. P. (Northampton), R. H. (Durham), J. C. W. (Rora, Longside, Aberdeenshire), JONES (Winchester), J. E. P. (Edinburgh), J. S. (Rochdale), M. S. C. (Leeds), D. R. (Banbury), C. G. (Ash Road), M. H. (Newbury), R. I. (Padbury), A. D. F. (Worthing), W. S. (Penge), R. N. (Liverpool), A. L. (Warwick), B. N. (Cardiff), answered per ordinary letter.

Practical Perspective for Pupil Teachers.

BY

E. G. BAKER, B.SC., B.A.,

Vice-Principal of the Training College, Carmarthen.

OUR next exercises will deal with the projection of rectangular solids which are pierced with holes of various shapes, and will serve to introduce the projection of solids pierced by other solids.

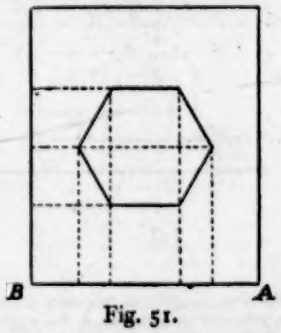


Fig. 51.

EXERCISE.—Fig. 51 is the front elevation to half scale of a rectangular slab 1½ ft. thick, pierced through its centre so that a hexagonal hole is formed.

It is required to represent this solid in perspective as seen by a spectator whose height is 4 ft. and distance from the picture plane 9 ft., the corner A to be on the ground plane 4 ft. to the right and 1½ ft. in the picture, and AB to recede to the left at an angle of 55° with the ground line.

Fig. 52 (2) is inserted to show how the diagonals of a square may be employed to save work, when it is required to project a square slab through which passes a concentric square hole, the sides of the hole being parallel to those of the slab. In this case the hole is pierced vertically. If the hole had been of

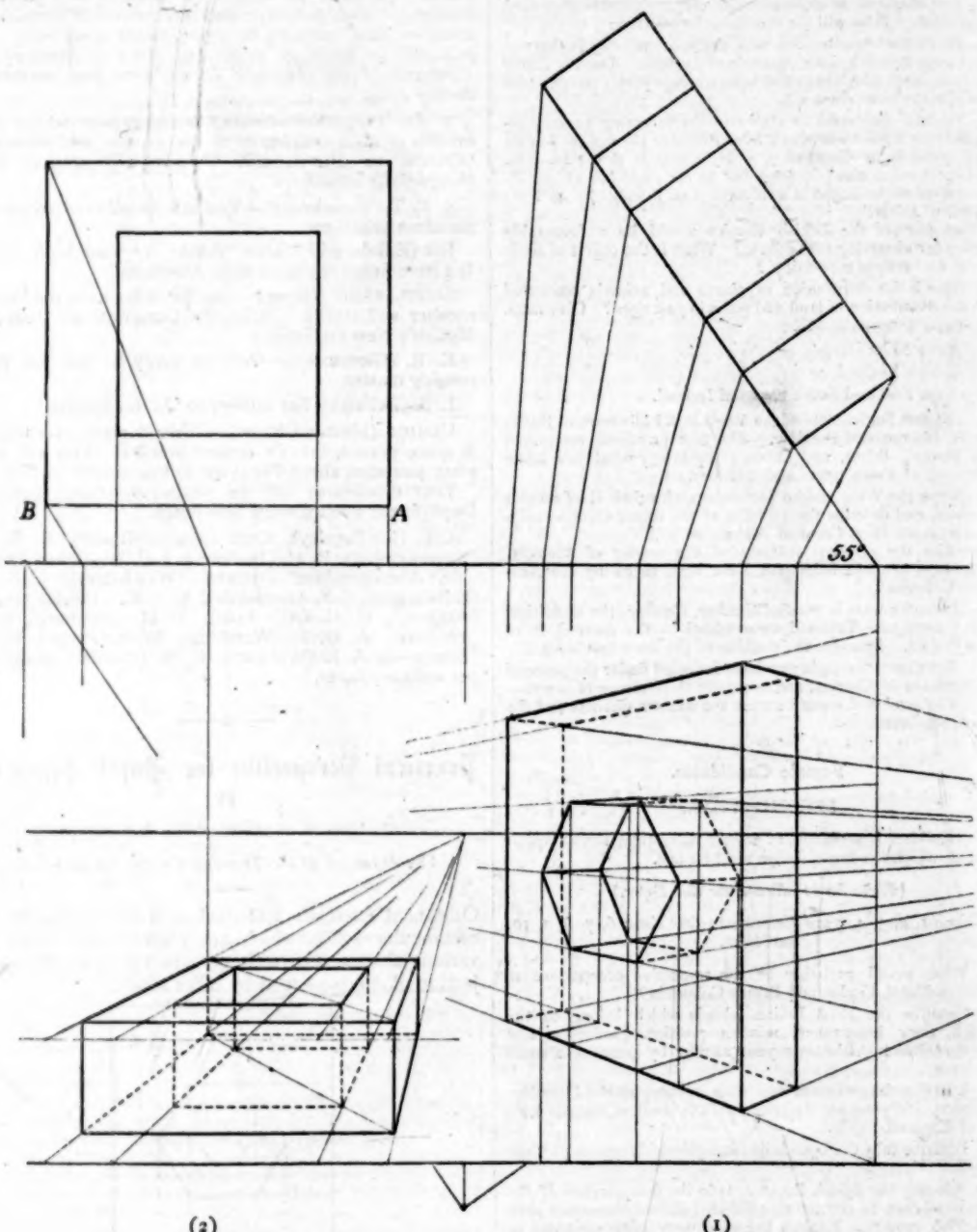


Fig. 52.

Fig. 52 (1) shows the solution of this problem, and the student should have no difficulty in recognising the method, which has been employed before. First project the slab, then a hexagon on each face, and show the edges of the hole which are perpendicular to the faces of the slab, noting particularly those edges, and part of edges, which are seen by the spectator.

any other shape a figure would have been projected on the level of each horizontal face. The projection in such a case must be treated by the most convenient method, either independently of the projection of the slab, or making some use of it as in this case.

The following exercises are based on the solutions shown in fig. 52.

PROBLEMS.

Height of spectator 4 ft.; distance of spectator from the picture plane 11 ft.

Scale $\frac{1}{2}$ in. to the foot.

1. The plan shown in fig. 52 (2) is that of a square slab 1 ft. thick. with a square hole pierced through it. Represent the frame in perspective, the point A on the ground plane being 1 ft. to the left and 1 ft. in the picture, and the side AB receding from the ground line towards the left at an angle of 40°.

2. Taking fig. 51 to be the plan to half scale of a slab 1 ft. thick pierced through its centre in a hexagonal hole; place the solid in perspective, supposing it to rest on the ground plane with the angle A in front of the spectator and 1 ft. behind the picture plane; and the side AB making an angle of 55° with the ground line towards the left.

Note that the dotted lines may be made use of to project the hexagon, or if the student prefer, the hexagon may be treated independently of the slab.

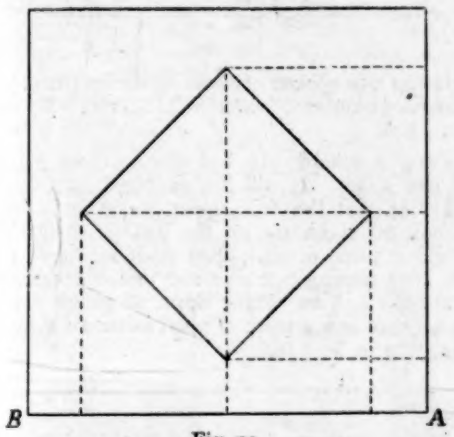


Fig. 53.

3. Fig. 53 is the plan to full scale of a square slab 1 ft. thick, with a square hole pierced through its centre. Place the object in perspective, so that the point A on the ground plane may be 2 ft. to the left and 1 ft. in the picture, the side AB making an angle of 40° with the ground line towards the left.

It will be found convenient to make use of the dotted lines in projecting the inner square since the vanishing point for two of its sides will be out of reach.

4. Re-work the last problem, every detail remaining as before except that the side AB is to be parallel to the ground line.

In this case the dotted lines may be used, or the small squares may be projected independently. It will be a good plan to employ the latter method in this case as a variety.

5. Taking fig. 53 to be the front elevation of a slab 1 ft. thick, standing on the ground plane on AB as base, a square hole being pierced through its centre; place the object in perspective. The corner A is to be 2 ft. to the right and touching the picture plane, and the edge AB is to recede towards the left so as to make an angle of 35° with the ground line.

The plan will be a rectangle of length AB and breadth 1 ft. The dotted lines must be used to obtain the angles of the smaller squares. See fig. 52 (1).

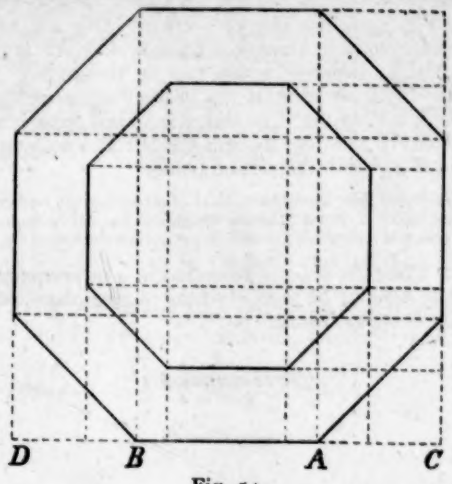


Fig. 54.

6. Fig. 54 is the plan of two concentric octagons, in the same plane, which lie on the ground. The angle A is 1 ft. to the left and 2 ft. in the picture, and AB makes an angle of 40° with the ground line. Represent them in perspective.

The dotted lines are the key to the projection, and there should be no difficulty.

7. Suppose the octagons in fig. 54 to be the plan of a framework 2 ft. high, and the angle A and the edge AB on the ground to be situated as in 6. Draw the perspective representation of the framework.

Here the work of 6 has to be done twice, once for the ground plane as in 6, and once for a picture line 2 ft. above the ground line. Then, by joining corresponding angles, the framework is completed.

8. Take fig. 54 to represent the front elevation of the framework described in 7, as it stands on the base AB, the angle A and edge AB being situated as in 6 and 7. Place the framework in perspective.

The plan will be a rectangle of length CD and breadth 2 ft. Fig. 45 shows the method of using the dotted lines if the student needs any help.

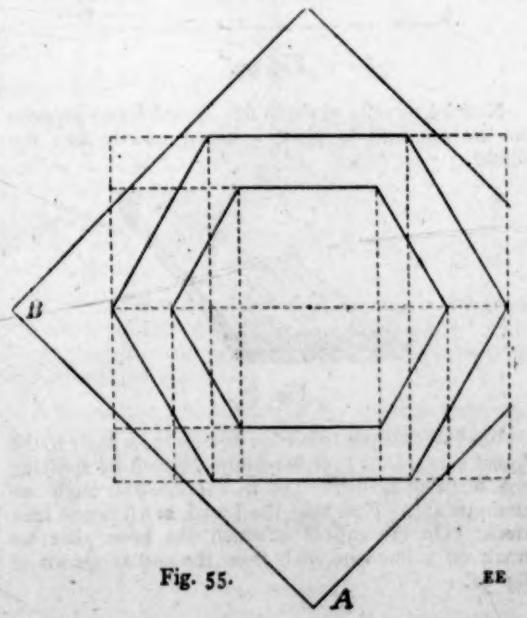


Fig. 55.

9. Fig. 55 is the plan of a square block 1 ft. high, on which rests a hexagonal framework which is also 1 ft. high. Represent the two in perspective the square block to rest on the ground plane with the angle A 2 ft. to the right and 1 ft. in the picture, and the face AB receding towards the left and making an angle of 45° with the picture plane.

The dotted lines show the method of projecting the hexagons. Picture lines 1 ft. and 2 ft. above the ground line will be required. The centre of vision will be used in projecting the hexagons.

10. Place the objects described in 9 in perspective, so that AB may be parallel to the picture plane, other details being as before.

(To be continued.)

An Elementary Course in the Use of Wood Working Tools.

BY FRED. WILKINSON, F.G.S.,

Science Teacher under the Bolton School Board.

We shall next show how we may take a little from the edges of boards by means of the shooting board. It not infrequently happens that we are required to take a thin shaving from one of two boards in order to make them exactly alike. All that we have to do in this case is to lay it on the shooting board and apply the plane as before. Fig. 90 shows plan of the plane, board to be made a little less, and shooting board.

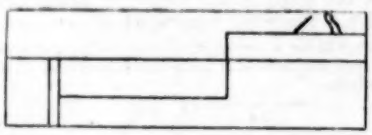


FIG. 90.

Now let us refer again to fig. 87 and let us suppose we are required to plane a board exactly like the figure.

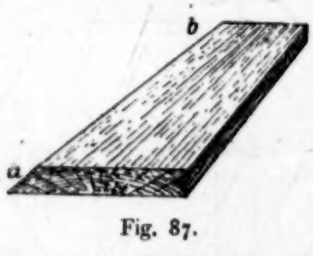


Fig. 87.

We find that the side edge here is at an angle to the broad side. This form is readily obtained by applying the shooting board. Let us suppose the angle we desire is 45°. Now take the board, say it is one inch thick. On the end of it which has been shot we mark off a line one inch from the end as shown in fig. 91.

FIG. 91.

Now draw the diagonal and we see at once how much has to be removed by the plane.

Draw exactly the same at the opposite end.

Now we apply plane and shooting board. Fig. 92 gives us an end elevation of plane, board and shooting board.

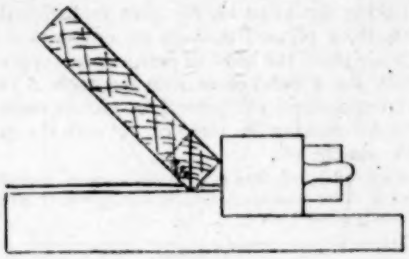


FIG. 92.

Having now spoken of shooting the ends and sides of boards we return to exercise XIX., viz., To make a plain box.

Obtain a suitable piece of pine. Plane one side and one edge. It will be observed on reference to fig. 85 that the four upper pieces or sides of the box all stand up on the bottom, so that it is the widest piece of all. Over all it measures 5 in. Now after planing one side and one edge gauge to thickness, viz., $\frac{3}{8}$ in. Plane down to gauge lines so that we have now a piece of wood as shown in fig. 93, 30 in. × 4 in. × $\frac{3}{8}$ in.

FIG. 93.

The proper width is to be 3 in., so that we must gauge to 3 in. and plane off. We have now to cut two pieces 9 in. in length and two $4\frac{1}{4}$ in. in length. Our box, we said, was to be 5 in. in width, and in cutting the two end pieces we must consequently allow for the two sides, which are $\frac{3}{8}$ in. thick. This will leave, as we just said, the length of the end pieces $4\frac{1}{4}$ in. It would be well to add that it is better to have the piece of wood a shade over $\frac{3}{8}$ in. thick, for the following reason—We may find in squaring up the box that we have a little to take off with the smoothing plane, and if we have allowed a little we shall be able to obtain our box square and of proper dimensions. Now mark off the lengths of the four pieces and saw off, allowing just a little for the sawing. We must next shoot the eight ends, and great care must be used to obtain as true ends as possible, viz., ends perfectly square with the sides. Plane up a piece for the bottom 9 in. × 5 in. × $\frac{3}{8}$ in., allowing as before just a little over $\frac{3}{8}$ in. for squaring purposes. The next operation is that of nailing. Obtain 22 one-inch sprigs. Place the four pieces together as shown in fig. 94.

FIG. 94.

On the two longer sides indicate the position of the sprigs by drawing a line $\frac{3}{16}$ in from either edge and mark at distance of one inch three points. Take the hammer and drive in the centre sprigs, taking care to see that the heads of the sprigs lie in the direction of the grain of the wood and not across it. Now drive in the centre sprigs on the other side. When these are correctly driven, place the others in the positions allotted for them. Fix on the bottom. The sprigging will be found a little more difficult than is at first anticipated, but care will result in success. The next operation is to drive the sprigs further into the wood so that we may plane the outer surfaces of the box without striking the sprigs with the plane iron of the smoothing plane. This we do by using a small punch, held vertically on the head of the sprig; and applying a smart, though not heavy, blow, we drive the sprig below.

Let the pupil next try if the box is square. In all probability he will find that it is not. It must now be made so. Place the box in the vice, bottom upwards. With smoothing plane take off a few shavings for a good surface. Now square the bottom with the four sides as shown in figs. 95 and 96.

FIG. 95.

FIG. 96.

When these are true then we must true the four sides with each other. The stock of the try square this time must not touch the bottom at all, but be applied entirely to the four sides. When this is done the box is completed.

SEVENTH TOOL: CHISEL.—One of the commonest and most useful of the cutting tools is the chisel. It is often called 'the firmer chisel.' Fig. 97 gives a good idea of what it is like when the handle is off.

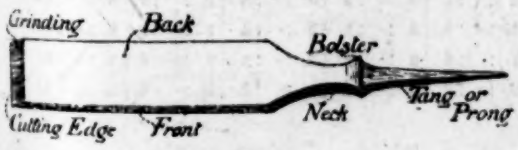


Fig. 97.

The chief parts are as follows:—Tang or prong, bolster, neck, back, front, grinding, and cutting edge. It may be said here that in sharpening up this tool all that has been said in sharpening the plane irons of the smoothing and jack plane applies equally well. The handle is usually made of box or ash.

Exercise XX.

To pare or round off a corner by means of a firmer chisel.

Obtain a block and plane up one face and one edge. The size of block should be 6 in. × 4 in. × 1 in.

Shoot both ends and draw a line two inches from the edge and mark the centre of this line.

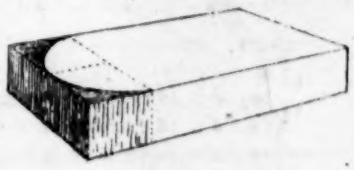


Fig. 98.

In fig. 98 we see what is required. Now take the compass, and with this point as centre describe a semicircle. It is proposed now to cut off the part shaded in the diagram. Place the block upon the bench over some board which should always be placed on the bench to protect it. Let the thumb and wrist rest upon the wood we are cutting, and place the thumb so that it lies parallel to the curve. Take the one-inch chisel in the right hand firmly, and bring the right shoulder over the work. Now apply the shoulder to the handle and place the cutting edge of the chisel in position A, as shown in diagram 99.

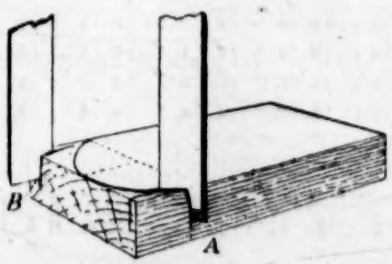


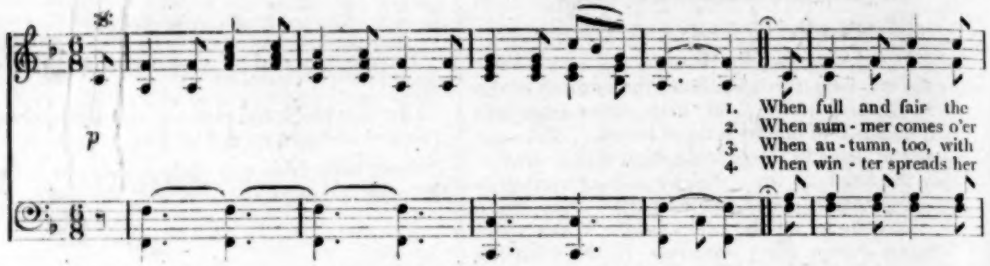
Fig. 99.

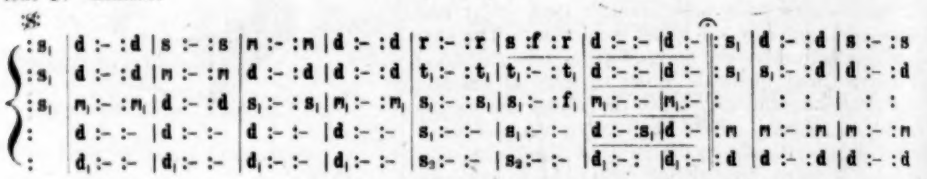
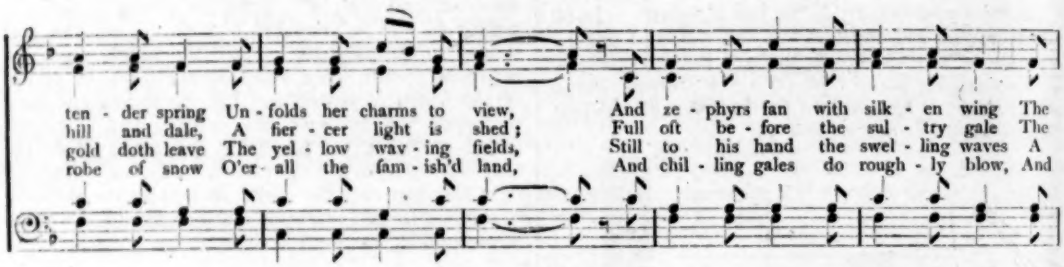
If we had commenced as in B, fig. 99, splitting of the wood would undoubtedly have taken place. As it is, splitting of wood does take place, but our work is not injured thereby.

A useful rule when applying the chisel is always to let the cutting cause the splitting to take place from the finished face and not towards it.

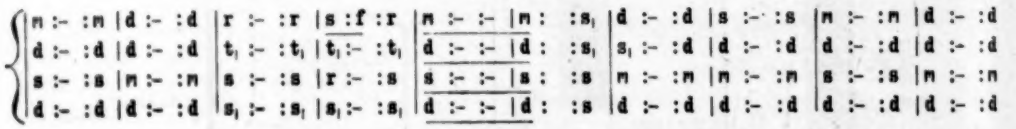
(To be continued.)

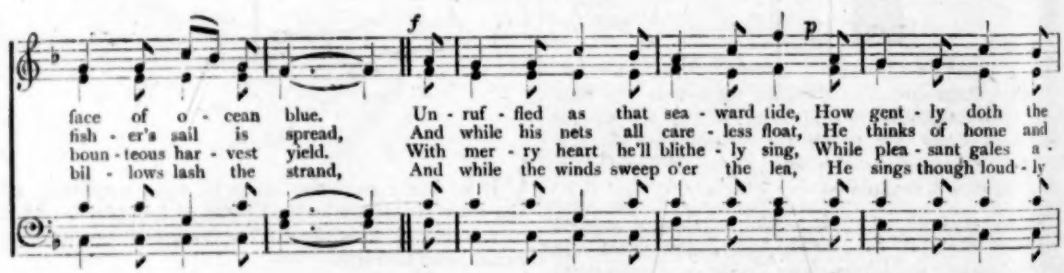
THE FISHERMAN.

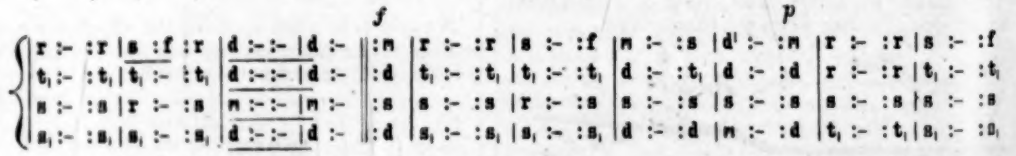
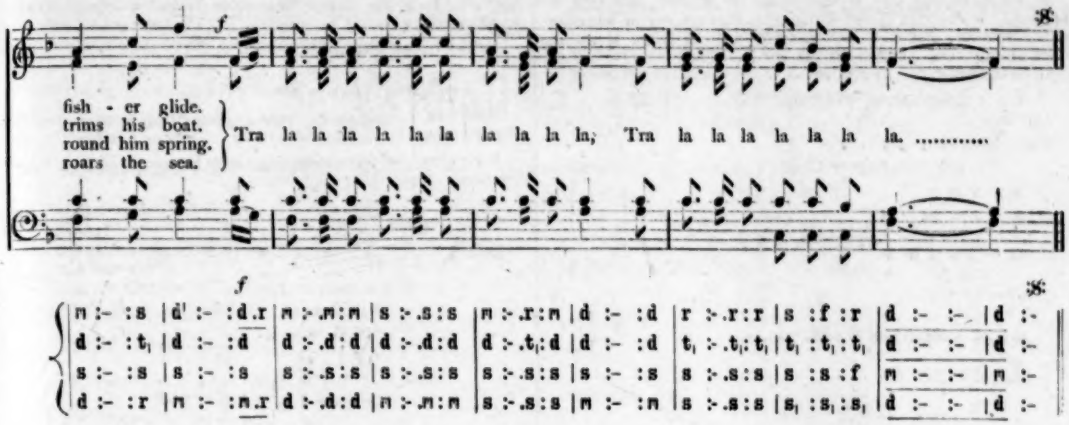
Siciliano. MÜLLER, 1794. (*German Bierlied.*)

KEY F. *Siciliano.*



ten - der spring Un - folds her charms to view, And ze - phyrs fan with silk - en wing The
hill and dale, A fier - cer light is shed; Full oft be - fore the sul - try gale The
gold doth leave The yel - low wav - ing fields, Still to his hand the swel - ling waves A
robe of snow O'er all the fam - ish'd land, And chil - ling gales do rough - ly blow, And




f
p
face of o - cean blue. Un - ruf - fled as that sea - ward tide, How gent - ly doth the
fish - er's sail is spread, And while his nets all care - less float, He thinks of home and
boun - teous har - vest yield. With mer - ry heart he'll blithe - ly sing, While plea - sant gales a -
bil - lows lash the strand, And while the winds sweep o'er the lea, He sings though loud - ly



Query Column.

RULES.

1. **Each correspondent is restricted to *one question*.** We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessariiy for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher*, *Pilgrim Street, Ludgate Hill, London, E.C.*

Arithmetic.

1. HERBERTUS.—Marks are made on the rims of two wheels of a carriage, whose circumferences are 14 ft. and 19 ft. 3 in., at the points where they touch the ground. If the carriage be set going at the rate of 7½ miles an hour, in how many seconds will the two marks be on the ground together?

(*Naval Cadet Exam. Paper.*)

Time for revolution of 1st wheel

$$= \frac{14 \times 3600 \times 2}{15 \times 5280} \text{ sec.}$$

$$= 2\tfrac{2}{11} \text{ sec.};$$

$$= 1\tfrac{1}{11} \text{ sec.};$$

Time for revolution of 2nd wheel

$$= \frac{79 \times 3600 \times 2}{4 \times 15 \times 5280} \text{ sec.}$$

L.C.M. of $1\frac{1}{11}$ sec. and $2\frac{2}{11}$ sec.

= L.C.M. of $\frac{12}{11}$ sec. and $\frac{24}{11}$ sec.

$$= \frac{36 \times 79}{11} \text{ sec.}$$

$$= 1\tfrac{192}{11} \text{ sec.}$$

$$= \underline{100\tfrac{8}{11} \text{ sec.}} \text{ Ans.}$$

2. LONG HORSLEY.—A tradesman's average annual gain from the year 1853 to 1863, both inclusive, was £184 11s. 6d.; in 1853 he lost £76 8s. 4d., and in 1864 he gained £151 9s. 10d. What was his average annual gain from 1854 to 1864, both inclusive? (*Barnard Smith.*)

Gain from 1853 to 1863 = £184 11s. 6d. × 11
= £2,030 6s. 6d.,

,, 1854 to 1863 = £2,030 6s. 6d. + £76 8s. 4d.
= £2,106 14s. 10d.,

,, 1854 to 1864 = £2,106 14s. 10d. + £151 9s.
= £2,258 3s. 10d.,

∴ Average annual gain from 1854 to 1864
= £2,258 3s. 10d. ÷ 11
= $\underline{£205\ 5s.\ 9\tfrac{7}{11}d.}$ Ans.

Note.—To obtain the answer in book the loss in 1853 was *subtracted*, whereas it should be *added*, as without that year the total gain would be greater not less.

Algebra.

1. M. R.—If $x^2 + 7x + c$ is exactly divisible by $x + 4$, what is the numerical value of c^2?

(*Certificate Exam., Females, 1st Year, Scotland*, 1889.)

$$\begin{array}{l} x+4)\,x^2+7x+c\,(x+3 \\ \quad x^2+4x \\ \quad\quad 3x+c \\ \quad\quad \underline{3x+12} \end{array}$$

$c = 12$,

$\therefore \underline{c^2 = 144}$. Ans.

2. E. W. R.—A and B take a certain number of sheep to market. If A received one sheep from B, they would have an equal number; but if B received one from A, then B would have double the number driven by A. How many did they take to market?

Let x = number of sheep that A took,
and let y = " " B took;

Then (1) $x + 1 = y - 1$
(2) $y + 1 = 2(x - 1)$

(1) $y = x + 2$
(2) $y + 1 = 2x - 2$
$y = 2x - 3$,
$\therefore 2x - 3 = x + 2$
$\therefore x = 5$.
$y = x + 2$
$\therefore y = 7$.
$\therefore$ A took 5 sheep and B took 7 sheep.

3. HERBERTUS.—Solve:—

$$\begin{cases} \dfrac{\frac{7x}{4} + 6y}{5} - \dfrac{\frac{3y+6}{5} - \frac{3x-2}{10}}{8} = \dfrac{80-x}{16}, \\ \dfrac{3x}{10} - \dfrac{y}{6} = \dfrac{y}{15} + \frac{1}{2} \end{cases}$$

(*Naval Cadets*, June, 1890.)

$$(1)\quad \frac{\frac{7x}{4} + 6y}{5} - \frac{\frac{3y+6}{5} - \frac{3x-2}{10}}{8} = \frac{80-x}{16}$$

$$\frac{7x + 24y}{20} - \frac{6y + 12 - 3x + 2}{80} = \frac{80-x}{16}$$

Multiplying each side by 80]

$$28x + 96y - 6y - 14 + 3x = 400 - 5x$$
$$31x + 5x + 90y = 400 + 14$$
$$36x + 90y = 414$$
$$2x + 5y = 23.$$

$$(2)\quad \frac{3x}{10} - \frac{y}{6} = \frac{y}{15} + \frac{1}{2}$$

Multiplying each side by 30]

$$9x - 5y = 2y + 15$$
$$9x - 7y = 15.$$

(1) $2x + 5y = 23$
(2) $9x - 7y = 15$
(1) $18x + 45y = 207$
(2) $18x - 14y = 30$
$59y = 237$
$\therefore y = 3$.

(1) $2x = 23 - 5y$
$= 23 - 15$
$= 8$.
$\therefore x = 4$.
$\therefore x = 4$ and $y = 3$.

4. N. W. T.—A man having lent 10,000 dollars at 5 per cent. interest, payable half-yearly, wishes to receive his interest in equal portions monthly, and in advance: how much ought he to receive every month?

(From *Hamblin Smith*, adapted to Canadian Schools by *Kirkland* and *Scott*.)

The question does not state whether the interest on the payments is simple or compound. We shall therefore take them at simple interest.

If A = a monthly payment, and r = interest per pound monthly, then amount for six months

$= 6A + (6r + 5r + 4r + 3r + 2r + r)A$
$= 6A + 21r\,A$
$= A(6 + \frac{21}{240})$
$= A \times \frac{487}{80}$,
$\therefore A \times \frac{487}{80} = 2\frac{1}{2}$ per cent. on 10,000 dollars
$= 250$ dollars,
$\therefore$ Monthly payment $= (250 \times \frac{80}{487})$ dollars
$= 41\frac{243}{487}$ dollars. Ans.

5. B. C.—Why cannot ·010010001, &c., be expressed as a vulgar fraction?

·010010001, &c.
$= \frac{1}{10^2} + \frac{1}{10^5} + \frac{1}{10^9}$ + &c.

Now this series does not form a geometrical progression, and therefore we cannot find the sum of an infinite number of terms.

Wherefore the decimal series cannot be expressed as a vulgar fraction.

6. ENDYMION.—Solve:—

$$3^{2x} + 9 = 10.3^x.$$

(*Hall and Knight.*)

$3^{2x} + 9 = 10.3^x$
$3^{2x} - 10.3^1 = -9$
$(3^x)^2 - 10.3^x = -9$
Put y for 3^x,
Then $y^2 - 10y = -9$
$y^2 - 10y + 5^2 = 25 - 9$
$= 16$
$y - 5 = \pm 4$
$\therefore y = 9$ or 1.
$3^x = 9$ or 1
$\therefore x = 2$.

7. A. POWELL.—If $a + b + c = 0$,

Prove $\dfrac{a^2}{2a^2 + bc} + \dfrac{b^2}{2b^2 + ca} + \dfrac{c^2}{2c^2 + ab} = 1$.

(*Hall and Knight.*)

If $\dfrac{a^2}{2a^2 + bc} + \dfrac{b^2}{+ 2b^2\ ca} + \dfrac{c^2}{2c^2 + ab} = 1$

$a^2(2b^2 + ac)(2c^2 + ab) + b^2(2a^2 + bc)(2c^2 + ab) + c^2(2a^2 + bc)(2b^2 + ac)$
$= (2a^2 + bc)(2b^2 + ac)(2c^2 + ab)$
$4a^2b^2c^2 + 2a^3c^3 + 2a^2b^3 + a^4bc + 4a^2b^2c^2 + 2b^3c^3 + 2a^3b^3 + ab^4c + 4a^2b^2c^2 + 2b^3c^3 + 2a^3c^3 + abc^4$
$= 9a^2b^2c^2 + 4a^3b^3 + 4a^2c^3 + 4b^3c^3 + 2a^4bc + 2ab^4c + 2abc^4$
$3a^2b^2c^2 = a^4bc + ab^4c + abc^4 = abc(a^3 + b^3 + c^3)$
$\therefore a^3 + b^3 + c^3 = 3abc$.
If $a + b + c = 0$
$a + b = -c$
$(a + b)^3 = -c^3$
$a^3 + 3a^2b + 3ab^2 + b^3 = -c^3$
$a^3 + b^3 + c^3 = -3a^2b - 3ab^2$
$= 3abc - 3a^2b - 3ab^2 - 3abc$
$= 3abc - 3ab(a + b + c)$
$= 3abc - (3ab \times 0)$
$= 3abc$. Q.E.D.

8. CYCLOPS.—A rectangle measures 588 square yards, and its diagonal is 35 yards. Find the length of its sides.

Let x = length in yards,
and let y = breadth " ;

Then (1) $xy = 588$
(2) $x^2 + y^2 = 35^2$
(2) $x^2 + y^2 = 1{,}225$
(1) × (2)] $2xy = 1{,}176$

Adding] $x^2 + 2xy + y^2 = 2{,}401$
Extracting square root] $x + y = 49$.
Subtracting] $x^2 - 2xy + y^2 = 49$
Extracting square root] $x - y = 7$.

$x + y = 49$
$x - y = 7$
$\therefore 2x = 56$
$2y = 42$
$\therefore x = 28$ and $y = 21$.
$\therefore$ Length = 28 yards, and breadth = 21 yards.

General.

1. HARDY.—One pound of lead (specific gravity 11) is tied by a thin piece of string to a piece of cork (specific gravity ·22), and when they are put in water one-half of the cork is immersed. How much does the cork weigh? Ans. $\frac{5}{6}$ lbs.

(From *The Elements of Dynamics*, by J. Blaikie, p. 131.)

Since the combination is in equilibrium, the weight of the cork and lead is equal to the upthrust of the water, that is, is equal to the weight of the water displaced.

Let x = weight of cork.

Then the forces acting downwards $= x + 1$ pounds.

The weight of the cork immersed $= \frac{x}{2}$ pounds.

And since specific gravity $= \frac{\text{weight of substance } (x)}{\text{weight of an equal volume of water } (W)}$

We have $0{\cdot}22 = \frac{x}{2} \div W$.

Therefore the weight of water displaced $(W) = \frac{x}{2 \times 0{\cdot}22}$ pounds.

Similarly, in the case of the lead, we have :—

Weight of displaced water $= \frac{1}{11}$ pounds.

Hence $x + 1 = \frac{x}{2 \times 0{\cdot}22} + \frac{1}{11} = \frac{x + 0{\cdot}04}{0{\cdot}44}$

$\therefore x + 0{\cdot}04 = 0{\cdot}44\,(x + 1)$

$= 0{\cdot}44x + 0{\cdot}44$

And $x - 0{\cdot}44x = 0{\cdot}44 - 0{\cdot}04$

Or $0{\cdot}56x = 0{\cdot}40$

Therefore $x = \frac{0{\cdot}40}{0{\cdot}50} = \frac{4}{5}$ pounds. Q. E. D.

2. PUZZLED.—(*a*) In the solution it states that five Saturdays can occur in February only in a leap year.

As the 1st February in a leap year falls two days earlier than in the previous leap year, there must be seven leap years before it can fall again on the same day. Now 7 leap years = 28 years. Is it quite clear now?

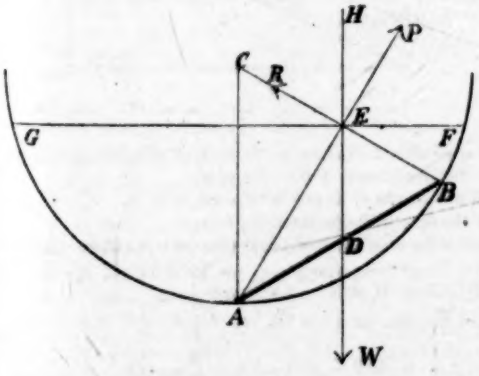
(*b*) The fourth part of the years will give the number of days for the leap years, and this added to the year will give the number of extra days, that is, a day for each year and extra days for the leap years.

If the number of days will divide exactly by 7, it will give an exact number of weeks, and therefore the 1st of March will fall on the same day.

3. DAUNTLESS.—(*a*) A rod (AB) of uniform density is fastened by a hinge at A to the lowest point of a hemispherical bowl, and rests with the other end (B) against the inner surface of the bowl; find the pressure on the bowl at B, and on the hinge at A, the length of the rod being equal to the radius of the bowl.

(*b*) A hollow sphere whose internal radius is r, is cut by a vertical plane through the centre; a uniform rod, whose length is $r\sqrt{2}$, is placed in it so as to have both ends on the circumference of the circle below the horizontal diameter; show that it will rest in *any* position, if the co-efficient of friction between the rod and the sphere equals $\sqrt{2} - 1$.

(*Advanced Theoretical Mechanics.*)



(*a*) The forces keeping the rod in equilibrium are :—(1) the weight of the rod; (2) reaction at B acting towards the centre; (3) pressure on hinge at A.

Since the lines of action of W and R meet at E, the pressure P must act in direction AE.

Also, since CAB is an equilateral triangle and CB and AB are bisected at E and D respectively, the angles HEC, PEF, are each 60°, and CEG and HEP 30°.

Resolving vertically $W = R \cos HEC + P \cos HEP$

$W = R \cos 60° + P \cos 30°$

$W = \frac{R}{2} + \frac{\sqrt{3}P}{2}$ (1)

Resolving horizontally $P \cos FEP = R \cos CEG$.

$\frac{P}{2} = \frac{R\sqrt{3}}{2}$

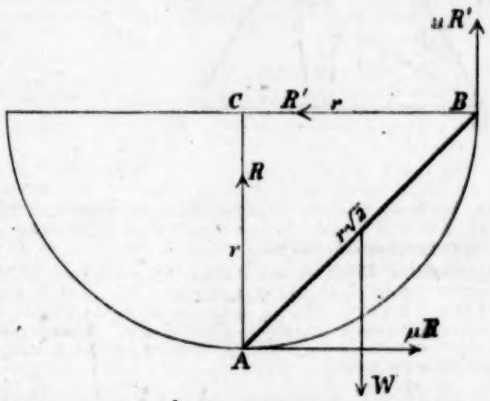
$\therefore P = R\sqrt{3}$ (2)

Substituting this value for P in equation (1)

$W = \frac{R}{2} + \frac{3R}{2} = 2R$

$\therefore R = \frac{W}{2}$.

From (2) $P = \sqrt{3}R = \frac{\sqrt{3}W}{2}$.



(*b*) It is evident that as the rod is changed from a horizontal position to one approaching more to the vertical, the tendency to slip will become greater, and that most friction will be called into play when the rod is in the position shown in the diagram, which represents the bottom half of the vertical hollow hemisphere.

Let u be the co-efficient of friction.

Forces keeping the rod in equilibrium are :—(1) weight of rod; (2) reactions R and R^1 at A and B respectively; (3) friction $= uR^1$ acting vertically at B; (4) friction $= uR$ acting horizontally at A.

Resolving vertically $W = R + uR^1$. (1)

Resolving horizontally $uR = R^1$. (2)

Substituting this value for R^1 in (1)

$W = R\,(1 + u^2)$

$\therefore R = \frac{W}{(1 + u^2)}$ (3)

Taking moments about C, the centre, gives

$uR^1r + uRr = \frac{Wr}{2}$

$u\,(R + R^1) = \frac{W}{2}$

Substituting value of R^1 from (2) $u(R + uR) = \frac{W}{2}$

$\therefore R = \frac{W}{2u(u + 1)}$ (4)

Equating (3) and (4) gives

$\frac{W}{(1 + u^2)} = \frac{W}{2u\,(u + 1)}$

$\therefore u^2 + 1 = 2u^2 + 2u$

$u^2 + 2u = 1$

$u^2 + 2u + 1 = 2$

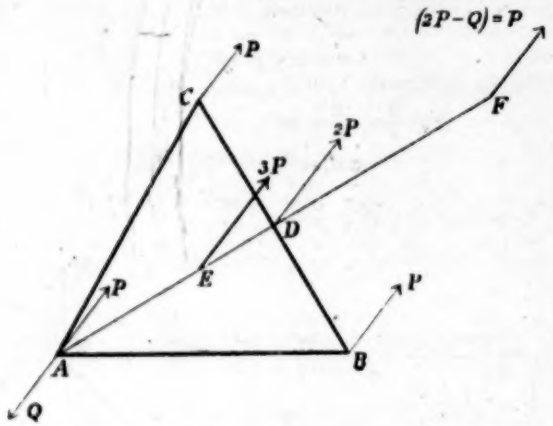
$u + 1 = \sqrt{2}$

$\therefore u = (\sqrt{2} - 1)$. Q.E.D.

4. ANGELO.—Equal parallel forces act at the angular points of an equilateral triangle; find their centre, (*a*) when the forces are *like*, (*b*) when one of them is *unlike* the other two.

P, Q, R are parallel forces acting in the same direction at the angular points respectively of an equilateral triangle ABC; if P = 2Q = 3R, find the position of their centre; also find its position if the direction of the force Q is reversed.

(*Advanced Theoretical Mechanics.*)



(*a*) Let P, P, P be the forces acting at A, B and C. The resultant of P at B, and P at C, will be a force of 2P acting at D, midway between C and B.

Resultant of 2P at D, and P at A, will be a force of 3P acting at a point E in AD such that P × EA = 2P × ED. ∴ ED = ⅓ EA = ¼ AD. E, the centre of the three forces, is therefore at the centre of gravity of the triangle. Whatever the direction of the forces be, so long as they are parallel, E will be found to be the centre.

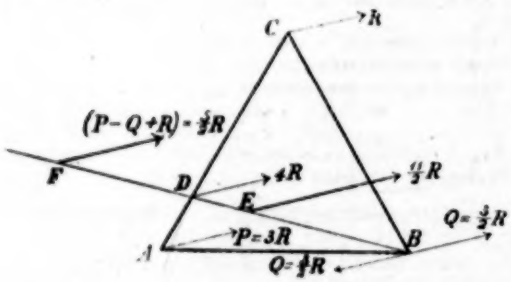
(*b*) Let a force Q, equal and parallel to P at A, but acting in an opposite direction, replace P. As before, resultant of P at C, and P at B, is a force of 2P acting at D.

Resultant of 2P at D and Q at A (now unlike forces) is (2P − Q) or P, acting at a point F in AD produced such that

$$Q \times AF = 2P \times FD$$

$$\therefore FD = \tfrac{1}{2} AF = AD$$

∴ the centre is at F, the vertex of an equilateral triangle on BC as base.



Resultant of P and R is a force of (3R + R) or 4R acting at a point D in AC such that

AD : CD :: R : 3R.

∴ AD = ¼ AC. Join DB.

Resultant of 4R at D and ⅔R at B is (4R + ⅔R) or 14/3R acting at E where DE : EB :: ⅔R : 4R;

∴ DE = ⅛ (DB − DE)

∴ 9/8 DE = ⅛ DB

∴ DE = 1/9 DB,

E is the centre of the like parallel forces P, Q and R. Suppose Q is now reversed.

Then the resultant of 4R at D, and ⅔R at B (now unlike forces) will be (4R − ⅔R) or 10/3R acting at F, a point in BD produced such that

FD × 4R = FB × ⅔R

∴ FD = ⅙ FB = ⅙ (FD + DB),

∴ ⅚ FD = ⅙ DB,

∴ FD = ⅕ DB.

F is the centre of the three parallel forces P, Q and R when Q is unlike the other two.

5. GUBBA.—A particle slides down a smooth inclined plane, and passes without loss of velocity on to a rough horizontal plane; it comes to rest after describing a distance on the horizontal plane equal to the distance it had described on the inclined plane; find the co-efficient of friction between the particle and the horizontal plane, and the whole time of the motion.

A and B are two bodies connected by a fine thread; B is placed on a rough inclined plane, and is drawn up it by A, which falls vertically; find the velocity when a length (*h*) of the plane has been described, and the tension of the thread.

(*Science Exam. Papers.*)

Let θ be the inclination of the inclined plane to the horizon, W the weight of the particle, u the co-efficient of friction, and l the distance through which particle slides on the inclined plane.

Energy of particle at the bottom of inclined plane = W × (vertical displacement) = W $l \sin \theta$.

This energy is destroyed by the resisting force of friction (= u W) acting through a distance l on the horizontal plane.

$\therefore u \text{ W} \times l = \text{W } l \sin \theta$

$\therefore u = \sin \theta$.

Acceleration down plane = $g \sin \theta = a$ and

$$s = \tfrac{1}{2} a t^2$$

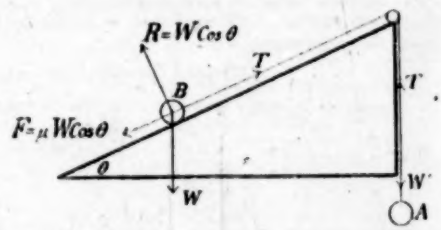
$$\therefore l = \tfrac{1}{2} g \sin \theta \, t^2$$

$$\therefore t^2 = \frac{2l}{g \sin \theta} \therefore t = \sqrt{\frac{2l}{g \sin \theta}};$$

$$\therefore \text{time of motion down plane} = \sqrt{\frac{2l}{g \sin \theta}}.$$

Since equal distances are traversed on the two planes, the retardation on the horizontal plane is equal to the acceleration down the inclined plane, and consequently the times of motion on the two planes will be equal;

$$\therefore \text{whole time of motion} = 2\sqrt{\frac{2l}{g \sin \theta}}$$



Let θ be the inclination of the inclined plane to the horizon,

a the acceleration of B up the plane,

W the weight of B and W' the weight of A,

T the tension of the thread,

and u the co-efficient of friction between B and the plane.

Resolving along the plane, we have for the moving force on B $(\text{T} - \text{W} \sin \theta - u \text{ W} \cos \theta)$

and the mass moved $= \frac{\text{W}}{g}$.

$$\therefore \text{T} - \text{W} \sin \theta - u \text{ W} \cos \theta = \frac{\text{W}}{g} a \quad (1)$$

Again, moving force on A = W' − T

and mass moved = $\frac{\text{W}'}{g}$

$$\therefore \text{W}' - \text{T} = \frac{\text{W}'}{g} a \quad (2)$$

Equating (1) and (2) we get

$$\frac{T - W\sin\theta - \mu W\cos\theta}{W} = \frac{W^1 - T}{W^1},$$

$$\therefore T\left(\frac{1}{W} + \frac{1}{W^1}\right) = 1 + \sin\theta + \mu\cos\theta$$

$$\therefore T = \frac{WW^1(1+\sin\theta+\mu\cos\theta)}{W + W^1} \quad (3)$$

From (2) $a = \frac{W^1 - T}{W^1} g$.

Substituting for T, $a = \frac{W^1 - \frac{WW^1(1+\sin\theta+\mu\cos\theta)}{W+W^1}}{W^1} g$

$$= \frac{W^1 - W(\sin\theta + \mu\cos\theta)}{(W + W^1)} g,$$

and if v be the velocity after a distance h has been traversed

$$v^2 = 2ah,$$

$$\therefore v^2 = 2gh\,\frac{W^1 - W(\sin\theta + \mu\cos\theta)}{(W + W^1)}$$

$$\therefore v = \sqrt{\left(2gh\,\frac{W^1 - W(\sin\theta + \mu\cos\theta)}{(W + W^1)}\right)}.$$

6. HARDY.—A barometer in which a little air has got into the upper part, is found to record 28 inches when it should record 30. If the volume of the space above the mercury be $7\frac{1}{2}$ cubic inches, what would be the volume of the air within it, at atmospheric pressure.

Pressure of air above mercury = weight of (30 − 28) cubic inches of mercury per square inch.

Pressure of atmosphere = weight of 30 cubic inches of mercury per square inch.

By Boyle's law, the pressure varies inversely as the volume, therefore we have :—

Press. of air above mercury : Pressure of atmosphere :: Volume required : Given vol.

2 : 30 :: Vol. required : $7\frac{1}{2}$ cubic inches.

$$\therefore \text{Vol. reqd.} = \frac{7\frac{1}{2} \times 2}{30} = \frac{1}{2} \text{ cubic inch.}$$

7. AMICITIA.—The letters are not well formed. They should have definite shapes and be neatly made. The small hand is better than the large. Numerically we should place and estimate the small hand at 60, the large at 50.

8. ABERDEENSHIRE.—The number of Grammars is endless. Smith's 'English Grammar,' Daniel's 'English Grammar,' or Hewitt's 'Mother Tongue' would suit your purpose. Try Mill's General Geography (Macmillan), and (Chisholm's Longmans).

9. JACQUES.—Yes, your reasoning would be accepted; it is easily followed and neatly expressed.

We cannot say whether you could pass without attempting the Algebra. We should not think your Euclid and Arithmetic would be likely to be well done if you could not do a little at the Algebra paper. As to the Essay, write to the Editor of the Certificate Class.

10. RALPHO.—Thornton, Physiography II., and the books there referred to would help you. Twisden's 'Mechanics' is a good book for your purpose; Garnett's 'Dynamics' also.

11. VYKING.—We cannot help you.

12. SCHOLARSHIP.—Parse the words in italic in the following passage, in such a manner as would fully satisfy the Examiner of Scholarship Candidates :—

'*Whoever* wishes to be well acquainted with the morbid anatomy of governments, whoever wishes to know *how* great cities *may be made feeble* and wretched, *should study* the history of Spain. The empire of Philip *the Second* was undoubtedly *one* of the most powerful and splendid *that* the world ever saw. If we overlook a *hundred* years, and then look at Spain, *what a change* do we find.'—*Macaulay*.

whoever—relative pronoun, 3 sing., nom. to 'wishes.'
how—indirect interrog. adverb of manner mod. 'may be made.'
may—verb of incomplete predication, strong-weak, intrans. indic. present, 3 pl., agr. with cities.
be made—verb. irregular weak, trs. pres. passive infinitive, gov. by may.
feeble—factitive adj. att. to cities.
should—verb of incomplete predication, strong-weak, intrans. indic. present, 3 sing. agr. with he (understood).
study—verb, weak, trs. pres. infin. active gov. by should.
the—adj. distinguishing Philip.
Second—adj. ordinal numeral att. to Philip.
one—pron., indef., 3 sing. neut. nom. in app. to empire.
that—pron. rel. 3 sing. neut. obj. by saw.
hundred—adj. cardinal numeral att. to years.
what—adj. interrog. att. to change.
a—adj. distinguishing change.
change—noun abs. sing. neut. obj. by find.

13. C. A. B.—The large hand is essentially bad. It cannot have been the result of careful preparation. The small hand is better but bad at the best. 40 and 50 out of 100.

14. LEX.—Large hand bad, too upright, 40. Small hand is plainly an imitation of a recognised hand and not a bad imitation. 60.

15. LA. C.—Write to Poole, Booksellers Row, W.C.; you will get what you ask. It is far more important to write legibly than spell out Cæsar's Gallic War. We cannot decipher your signature.

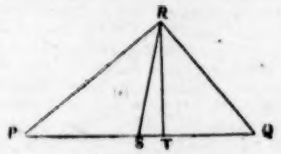
16. HOPE.—Why there is nothing to tell you if you can translate the passage, and if you cannot you would not be helped. Parse as in English with any necessary modifications.

17. D. V. JACOBS.—Thanks for pointing out mistake in the answer; it should be as you say $175\frac{1}{2}$. Slips will occur.

Geometry.

1. JOHN.—PQR is a right-angled triangle; from the right angle R, RS is drawn bisecting PQ at S, and RT at right angles to PQ, meeting it at T. Show that the angle SRT is equal to the difference of the acute angles at P and Q.

(*Schoolmaster*, July, 1890.)



Let PR be greater than QR.
Then ∠ PQR is greater than the ∠ QPR.
Proof.—∠s SRT, TSR = a right angle, (I. 32.)
= ∠s at Q and P,
And ∠ TSR = ∠s SPR, SRP, (I. 32.)
But ∠ SPR = ∠ SRP, (I. 5.)

As the line joining the right angle with the middle point of the base is equal to half the base,

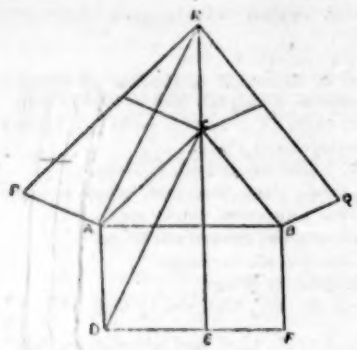
∴ ∠ SRT and twice ∠ P = ∠s at Q and P,
∠ SRT and ∠ P = ∠ Q,
∴ ∠ SRT = difference of angles at Q and P.

Q.E.D.

2. W. T. BALMER.—Prove the following theorem, and infer it from Prop. XLVII.

If CQ, CP be parallelograms described on the sides CA, CB of a triangle, and if the sides parallel to CA, CB be produced to meet in R, and RC be joined, a parallelogram described on AB with sides equal and parallel to RC shall be equal to the sum of the parallelograms CQ, CP.

(*Casey's* 'Sequel to Euclid.')



Proof.—RC is equal and parallel to AD,

∴ AR and CE are equal and parallel, (I. 33.)

Wherefore ARCD is a parallelogram, and △ ARC = △ ACD. (I. 34.)

Parallelogram CP is double of the triangle ARC, (I. 41.)

And parallelogram AE is double of the triangle ACD,

∴ Parallelogram AE = parallelogram CP;

Similarly it can be proved that parallelogram BE = parallelogram CQ.

∴ Parallelogram AF = parallelograms CP, CQ.

Q. E. D.

—o—

Publications Received.

PRIZE BOOKS.

BLACKIE AND SON.—Two Little Mice (*Garlick*); The Royal Eagle (*Thompson*); The Kitchen Cat (*Walton*); From over the Sea (*Tiddeman*); Lily and Rose in One (*Lowdnes*); Crowded Out (*Manwell*); Daphne (*O'Byrne*); Tom in a Tangle (*Sparrow*); Freda's Folly (*Haycraft*); Our Two Starlings (*Redford*); A Change for the Worse (*Capes*); Cross Purposes, and the Shadows (*Macdonald*); Patty's Ideas (*Fiddeman*); The Youngest Princess (*Chappell*); Arthur's Temptation (*Leslie*); Philip Danford (*Goddard*); Maori and Settler (*Henty*); The Seed and the Sowed (*Leslie*); A Rash Promise (*Lowdnes*); Hal Hungerford (*Hutchinson*); By England's Aid (*Henty*); Unlucky (*Austin*); A Chapter of Adventures (*Henty*); That Brown Roger and I (*Yoxall*); The Secret of the Old House (*Evelyn Everett Green*); Hussein the Hostage (*Norway*); A Rough Shaking (*G. Macdonald*); The Light Princess (*G. Macdonald*); Everybody's Business (*Imray Thorn*); By Right of Conquest (*G. A. Henty*); 'Twixt School and College (Gordon Stables).

HODDER AND STOUGHTON.—Hernier's Rosebuds (*Meade*); A Little Silver Trumpet (*Meade*).

THE NATIONAL SOCIETY'S DEPOSITORY.—Dangerous Jewels (*Bramston*); The Green Girls of Greythorpe (*Coleridge*); The Locked Desk (*Peard*); A Little Candle (*Debenham*); Peckover's Mill; The Family Coach (*Lee*); The Vicar's Trio (*Esmé Stuart*); The Slaves of Sabinus (*Charlotte M. Yonge*).

BACON, G. W., AND CO. (LIMITED).—Bacon's Excelsior Graduated Drawing Charts. Standards I. to VII. (*Studley and Tretman*).

BELL, G., AND SONS.—Cambridge Texts—Xenophon's Hellenica. Book I. (*Rev. Launcelot D. Dowdall*).

BLACKIE AND SON.—Elementary Text Book of Trigonometry (*Pinkerton*); Elementary Latin Grammar (Part I.); Geography of the British Empire (*Baker*).

CASSELL AND CO.—Laundry Work: How to Teach it (*Mrs. E. Lord*); Guide to Evening Classes in London; How to Shade from Models (*Sparkes*).

CLIVE, W. B., AND CO.—History of English Literature, 1485—1580 A.D. (*Low*).

CURWEN AND SONS.—Action Songs: The Golden Boat; (*Ormiston Chant*); The Sweeping Brush Brigade; The Wagoners' Chorus; Queen Anne Fan Song; Music at Sight (*J. Spencer Curwen*).

DAWSON, A. G.—The Townley Freehand Test Cards. Standards III. and IV.

FISHER UNWIN, T.—The Century Magazine—October; Every-Day Miracles (*Bedford Pollard*); Stops; or How to Punctuate (*Paul Allardyce*); English as she is Taught (*Le Row*); Alexis and his Flowers (*Cresswell*); Famous Musical Composers (*Lydia T. Morris*).

GILL, G., AND SONS.—The Principles of Practical Book-keeping (*Sarll*).

KEGAN PAUL, TRENCH, TRÜBNER AND CO., LIMITED.—Practical French Grammar. Part I. (*Mortimer de Larmeyer*).

LAURIE, T.—Laurie's Patent Noiseless Slate.

LEWIS, H. K.—Memorabilia Latina (*Levander*).

LONGMANS AND CO.—Essays on Educational Reformers (*Quick*).

MACMILLAN AND CO.—Second Greek Course (*Heard*); An Elementary Geography of India, Burmah, and Ceylon (*Blandford*); English Men of Action: Sir C. Napier (*Colonel Sir W. F. Butler*); Maps and Map Drawing (*Elderton*); Burke's Reflections on the French Revolution (*Selby*); Shakespeare's Richard II. (*Deighton*); Geography of Europe (*Sime*); German Composition, 1st Course (*Eugène-Fasnacht*).

MURRAY, JOHN.—English Latin Gradus (*Ainger and Wintle*).

NELSON, T., AND SONS.—Studies in Elocution (*Harrower*); Royal School Series: The Standard Author Readers, Nos. 1, 2 and 3.

SMITH, ELDER AND CO.—The Cornhill Magazine—October; Pocket Volume of Selections from the Works of Robert Browning.

THE CLARENDON PRESS.—Xenophon Memorabilia (*Marshall*).

—o—

How to Teach School Children to Sing from the Staff Notation.

BY W. G. McNAUGHT,

Associate of The Royal Academy of Music.

TUNE WORK FOR DIVISION III.—*continued.*

64. When the sharp fourth and the flat seventh have been well practised, as suggested in sections 56 to 62, free leaps to and from the diatonic tones of the scale should be steadily worked at. Such leaps present to the pupil two distinct difficulties. First, he must make out *what* tone of the scale he is to sing, and next he must realise its sound. Many rules and plans to help reading (using the word in the sense of merely finding the scale-name of a note) were given in sections 14, 21 to 27.

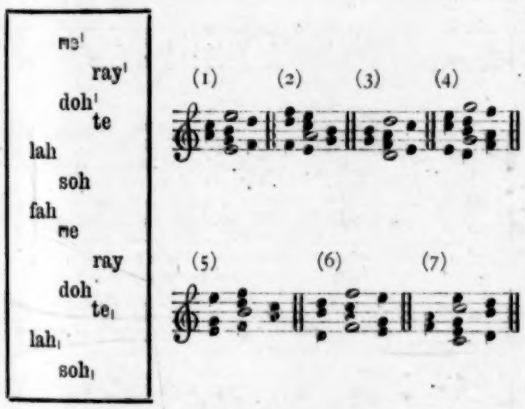
65. The most useful rules for reading are the following:

1. Fix the position of the tones of the doh chord. If the key-tone is low on the staff include the position of the high **doh**. If the key-tone is high include the low **soh** and do not trouble about the high **doh**.

2. Learn to recognise **ray** by its position between **me** and **doh**, **fah** as between **soh** and **me**, **lah** as just over **soh**, and **te** as just below high **doh**. Similarly, associate low **te** and low **lah**.

The cautious teacher will not place much reliance upon the simultaneous naming of notes by the class. Continued individual questioning is indispensable in teaching reading. In fact there is much less danger in the collective practice of *sound* finding than in name finding; because in the former case the pupils who only follow, at least get accustomed to the association of name and effect; but in the latter case the necessary mental process of reckoning may be entirely wanting. The teacher having secured the full attention of the class, and made each individual feel that he may be called upon to answer every question, should rapidly ask a number of questions, and *after* each question is put, should fix upon the pupil who is to answer.

For the purpose of these questions the blackboard may be prepared as follows:—



The open notes show the position of **doh**.

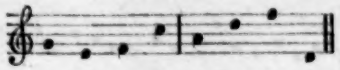
The lines should be well apart, so that every pupil can easily see the line or space pointed to by the teacher. The questions may take the following form:—

'I shall ask some one to name this line or space' (*points*). (Pause of a few seconds: Pupil selected. He answers, say, **lah**.) 'How do you know it is **lah**?' (Because it is just over **soh**.)

The key should be changed at first after three or four positions have been named, and later, as skill in naming advances, the pointer should go quickly from one key to another.

66. The naming of positions of single notes should as soon as possible be followed by the naming of little groups similarly pointed by the teacher. At first it is advisable to point each exercise several times before an answer is demanded. Another way of stimulating interest in naming is to get some pupil to come forward and point the positions of scale names called for. This process is certain to be watched with interest by the other pupils in the class.

67. All these processes should be regarded as preparatory to the reading of musical notation as it is actually written or printed, and not as a substitute for fully written exercises or pieces. A very good exercise in reading fully written exercises is to prepare the board—say as follows:—



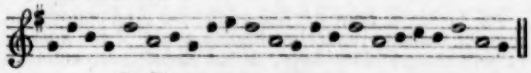
notes being placed on all the lines and spaces, but in no particular order. With this in view of the class, the teacher asks for the names of the first *group* of four notes, the first note to be taken as **doh**, **ray**, **me**, or **fah**, etc., and so on with the second group.

68. The study of the performance of the various scale leaps should go on side by side with the exercises in naming. Exercises in leaps should not be haphazard. At one time it will be well to select a few special leaps for study, at another some one interval (as thirds, or fourths, or fifths, etc.), at another all possible leaps to some one scale tone. At every practice at least two keys, one about D and another about G, should be used in order that the ranges from tonic to tonic and dominant to dominant may become familiar to the class. The following are exercises in the form suggested:—

LEAPS.

Soh to **ray**.

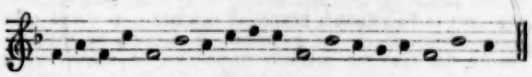
Doh on 2nd line.



s r

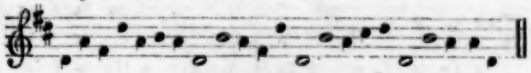
Doh to **fah**.

Doh 1st space.



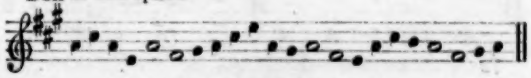
Doh to **Lah**.

Doh space below staff.

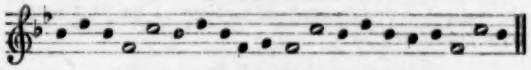


Doh to **lah** below.

Doh in 2nd space.

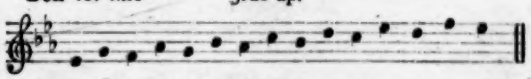


Low **soh** to **ray** above.

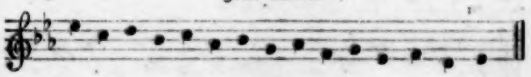


INTERVAL EXERCISES.

Doh 1st line 3rds up.

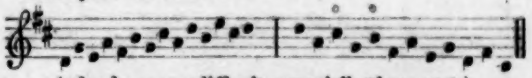


3rds down.



4ths up and 3rds down.

Doh space below staff.



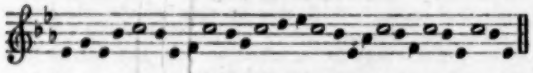
(4ths down are difficult, especially those at °.)

The other intervals should be similarly treated.

Leaps to ray.

Doh space below staff.

Doh first line. Leaps to **lah.**

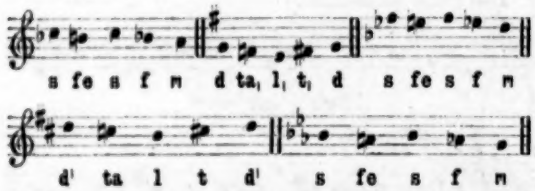


Other notes should be similarly treated.

69. The above exercises complete the preparation for the stipulated work of Division III. in the matter of tune. The following are tests that are within the Code requirements so far as construction is concerned. They are given in various keys because on the movable **doh** system all positions and pitches of key-tones are practically equal in simplicity or difficulty. In fact progress on this system is impeded if exercises are confined to the key of C, because the sol-fa names of lines and spaces get to be fixed. It is not necessary that the full meaning of the signature should be taught. It will suffice for the present to teach the old rules for finding the key indicated by a signature, viz.,

The last sharp to the right is on **te**,
The last flat to the right is on **fah**.

70. There is, however, one additional explanation that must be made to render intelligible a use of the *natural* in both sharp and flat keys. It has already been enforced that the *natural* can be interpreted only by reference to some preceding sharp or flat. It must now be shown that when **fah** is one of the positions flattened by the signature, **fe**, the sharp fourth, must be shown by a natural, because the note to be raised a semitone is a flat note ; and that when **te** is one of the positions sharpened by the signature, **ta**, the flat seventh must also be shown by a natural, because the note to be brought down a semitone is a sharp note, *e.g.*,

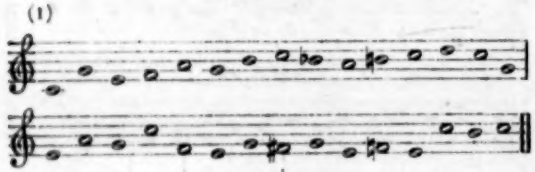


These explanations should not be very elaborate. It will not matter very much if many of the children at this stage do not clearly understand the reason for the use of the natural in this connection so long as they know they have got to sing **fe**.

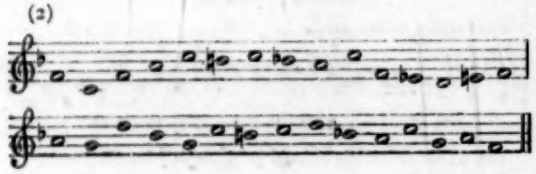
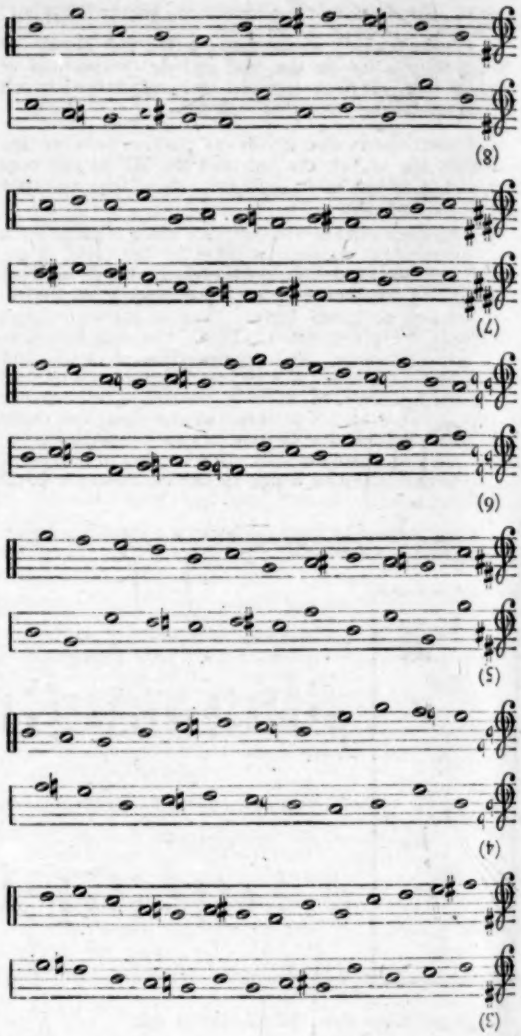
TUNE TESTS FOR DIVISION III.

(Within the Code requirements except as to key signature.)

(1)



(2)



(To be continued.)

Certificate Examination, 1889.

Female Candidates.

SECOND YEAR.

Grammar.

1. Write a brief essay on the sea.

About three-fourths of the surface of the globe consists of sea. This immense area of water is very unequally distributed, the Southern Hemisphere being more aqueous than the Northern, and the Western than the Eastern.

Although, nominally, the ocean is divided into five, bearing different names, yet, in reality, there is but one, as all the portions open, more or less broadly, into one another.

The means taken to prevent the stagnation and corruption of so mighty a mass (the foulness of which would annihilate all life) are manifold. The chief two, however, are motion and chemical agency.

The tides, the storms, the great ocean currents, all serve to keep up a circulation in the deep, that preserves it from becoming the gigantic cesspool of the world. The large amount of salt contained in solution, and the well-balanced animal processes continually in operation also contribute immensely to the great result, the one preventing putrefaction setting in, and the other consuming offensive matter.

Turning from the material to the abstract—the immensity, mobility, unchangeability and might of the sea overwhelmingly impress the mind with a sense of the infinite, both as regards space and time.

Montgomery writes—

'Unbeginning, endless sea,
Let me launch my soul on thee.'

And Byron rhapsodies—

'Time writes no wrinkle on thine azure brow;
Such as creation's dawn beheld thou rollest now.'

Magnificent, however, as are the ideas and language of poets, they are all surpassed by the inspired writers who makes use of the inconceivable magnitude of the ocean faintly to illustrate the omnipresence of the Deity, representing him as 'holding the sea in the hollow of his hand.'

2. Paraphrase *one* of the following passages, and explain fully the connection in which it stands:—

(*a*)

Our fears in Banquo
Stick deep; and in his royalty of nature
Reigns that which would be feared: 'Tis much he dares;
And, to that dauntless temper of his mind,
He hath a wisdom that doth guide his valour
To act in safety. There is none but he
Whose being I do fear; and under him
My genius is rebuked; as, it is said,
Mark Antony's was by Cæsar. He chid the sisters,
When first they put the name of King upon me,
And bade them speak to him; then prophet-like
They hailed him father to a line of kings:
Upon my head they placed a fruitless crown
And put a barren sceptre in my gripe,
Thence to be wrenched with an unlineal hand,
No son of mine succeeding. If it be so
For Banquo's issue have I fil'd my mind;
For them the gracious Duncan have I murdered;
Put rancours in the vessel of my peace
Only for them; and mine eternal jewel
Given to the common enemy of man
To make them kings, the seed of Banquo kings!

(*b*)

Macbeth. I have almost forgot the taste of fears;
The time has been, my senses would have cooled
To hear a night-shriek; and my fell of hair
Would at a dismal treatise rouse, and stir
As life were in it: I have supped full with horrors;
Direness, familiar to my slaughterous thoughts
Cannot once start me. Wherefore was that cry?
Servant. The queen, my lord, is dead.
Macbeth. She should have died hereafter;
There would have been a time for such a word.
To-morrow, and to-morrow, and to-morrow
Creeps in this petty pace from day to day,
To the last syllable of recorded time;
And all our yesterdays have lighted fools
The way to dusty death. Out, out brief candle!
Life's but a walking shadow; a poor player,
That struts, and frets his hour upon the stage,
And then is heard no more: it is a tale
Told by an idiot, full of sound and fury,
Signifying nothing.

(*a*) We are much disturbed by Banquo, for the ruling feature of his kingly disposition demands reverence. He hesitates at no risk, yet he unites with intrepidity a wise discretion that prevents his courage degenerating into rashness.

I dread none but him, but in him my spirit recognises its superior, just as Mark Antony crouched before Cæsar.

When the witches saluted me king he rebuked them, and commanded them to transfer their predictions to himself. Then they foretold that his posterity should constitute a dynasty, and that although I should myself reign, yet that I should not transmit my crown to my descendants, but that it should be snatched from my grasp by a stranger.

Should this be correct, then am I simply a tool—have polluted my spirit, have made my conscience remorseful, have sold my soul to the devil, to advance Banquo's offspring to royalty.

(*b*) I have become familiar with terror. Once on a time my blood would have been curdled by a scream from out the darkness, and a tale of horror would have made my hair arise and stand, instinct with life, on end. But I am glutted with affright. My sanguinary imagination has become so accustomed to crime that nothing can now terrify me.

O king, your wife no longer lives.

What! is she dead already? I could find plenty of leisure for such paltry news. Thus the world wags. Time comes and goes, and drags day after day his slow pace along until his very end. He has but guided his besotted sons unto their natural grave.

Let Life's short-lived taper be extinguished. Existence is but an animated simulacrum—a mediocre actor that poses before the public during his hour and then retires to the limbo of forgetfulness.

Our careers are like blustering and foolish babble, loud but meaningless.

3. Explain by the help of etymology or otherwise the meaning of the following expressions, and point out the connections in which they stand:—

Prophetic greeting. Supernatural soliciting. A peerless kinsman. Coign of vantage. We rest your hermits. Metaphysical aid. Artificial sprites. The rich East to boot.

'Witchcraft celebrates
Pale Hecate's offering.'

Prophetic greeting (Act i., scene iii., line 78).—*prophetes* (Gr.) = a soothsayer, *gretan* = to welcome. The witches by their salutation welcomed Macbeth as about to be king.

Supernatural salutation (Act i., scene iii., line 130).—(L.) *super* = above, *natura* = nature, *salutatio* = a greeting wishing health. The witches prophetically greeted Macbeth.

A peerless kinsman (Act i., scene iv., line 58).—(L.) *par*, (Fr.) *pair* = a match, (A.S.) *cyn* = race, relative. A matchless relative. Kings often called nobles their cousins.

Coign of vantage (Act i., scene vi., line 7).—*coin* (Fr.) = corner, *avantage* (Fr.) = profit, from *avant* = before. Convenient corner.

We rest your hermits (Act i., scene vi., line 20).—*eremites* (Gr.) = a solitary recluse. We remain your *beadsmen*, bound to pray (for you, our benefactors).

Metaphysical aid (Act i., scene v., line 27).—(Gr.) *meta* = beyond, *phusikes* = relation to nature, (Fr.) *aider* = to help, from (L.) *adjutare* = to help. Supernatural assistance.

Artificial sprites (Act iii., scene v., line 27).—(L.) *ars* = art, *facio* = I make; *spright* or *sprite* is corrupted from *spirit* (L.) *spiritus* = breath or immaterial being. Conjured-up phantoms.

The rich East to boot (Act iv., scene iii., line 47).—(A.S.) *bót* = profit. Gold, pearls, ivory, silks, etc., were brought to the Mediterranean from the East. The wealth of the East into the bargain.

Witchcraft celebrates pale Hecate's offering (Act iii., scene i., line 52).—(A.S.) *wicce* = a soothsayer, (A.S.) *craeft* = skill, (L.) *celebratus* = extolled, *Hecate* an infernal goddess, patroness of sorcery, tombs and murder. The sacrifices offered to her consisted of dogs, honey, black female lambs, and of many things generally held in loathing.

4. Analyse this sentence and parse the words in italics:—

'The times *have been*
That when the brains *were out*, the man *would die*,
And there *an end*; but now they rise again
With twenty mortal murders on their crowns
And *push us* from their stools.'

SENTENCE.	KIND OF SENTENCE.	SUBJECT.		PREDICATE.		OBJECT.		CONNECTIVES.
		SIMPLE.	ENLARGEMENT.	SIMPLE.	EXTENSION.	SIMPLE.	ENLARGEMENT.	
A The times have been that .....would die	Principal	times	the	have been that when the .....die				
A2 that when the brains were out	Adverb Mod. would die	brains	the	were out	...	...	...	that when
A3 the man would die	noun in apposition to times	man	the	would die	when the brains were out			
A4 there an end	noun in apposition to times	end	an	[would be]	when the brains were out	...	...	there
B But now they rise .....crowns	Principal Adversative to A	they	with twenty mortal murders.....crowns	rise	again	...	...	but
C And push us from their stools	Principal Co-ordinate to B	[they]	...	push	from their stools	us	...	and

5. Explain the use Shakespere makes in this play of supernatural agents; and show how far they help forward the development of the plot. In what other plays of Shakespere are such agents employed?

By the use of supernatural agents the poet (1) heightens the interest, (2) reveals more clearly the path of moral declension, (3) and shows that the promises of temptations even if fulfilled 'palter with us in a double sense.'

They forward the plot by (1) furnishing a suddenly implanted motive for Duncan's assassination, (2) by declaring Macbeth's intentions without long soliloquies, (3) by buoying him up against Malcolm's invasion by delusive promises.

Instances of Shakespere's employment of such agents are found in Hamlet, Cæsar, and the Midsummer Night's Dream.

6. Give the substance of the dialogue between Malcolm and Macduff in the fourth act, and illustrate from it Shakespere's conception of the characteristics of a good king.

(*a*) Malcolm, who is bemoaning Scotland, is exhorted by Macduff, whom he mistrusts, rather to avenge her. Nevertheless for some time he remains unconvinced of the other's sincerity, asks why Macduff's wife and child were left in the tyrant's clutches, and falsely represents himself to be inordinately intemperate, lustful, avaricious, untruthful, feeble, cruel, and to possess a host of other bad qualities. Thereupon Macduff in a burst of noble indignation declares that he is not fit to rule or even to live. Then Malcolm's doubts are swept away.

(*b*) A good king must be of a noble nature, just, truthful, temperate, firm, bountiful, persevering, merciful, lowly, devoted, patient, courageous, enduring. If he possess the majority of these good qualities a few not unimportant defects would not prevent him being an excellent sovereign. If he indulge in any personal vices great care should be taken to avoid scandal.

7. Give a summary of the contents of one of these Essays:—(1) Of Envy, (2) Of Great Place, (3) Of Wisdom for a Man's Self; and show how far Bacon's own career illustrates any of the statements and arguments employed.

(*a*) *Great Place* is a servitude which men cannot and will not quit. Whether acquired or retained or lost, office brings pain with it; yet as it gives scope for good works, it is the lawful object of aspirations. In office look both to precedent and present circumstances; be consistent, but in reason; preserve your own rights, and value the rights and services of inferiors. Avoid delays, corruption, roughness and facility. Office amends some characters but impairs others. A man may rise as a partisan, but in place he must be impartial and respectful both to his predecessors and colleagues. He must not import official formality into private life.

(*b*) The servitude of great place is shown by the subjugation of mind that it reduced Bacon to when out of office; and its scope for good works was utilized by Bacon to advance learning. In office Bacon clung much to old methods, but knew how to change with the times, as witness his prosecution of Essex. His character was distinctly impaired by office, for he rose as a partisan and did not avoid corruption.

8. Show by reference to the context what use Bacon makes of these sentences:—

(*a*) The virtue of prosperity is temperance.
(*b*) Nobility attempers sovereignty.
(*c*) Time is the greatest innovator.
(*d*) Atheism did never perturb States.

(*a*) *From Essay on Adversity.*—Bacon shows that moderation is a virtue, and that men should be unmoved by fortune, temperate in prosperity, and displaying fortitude in adversity.

(*b*) *From Essay on Nobility.*—The nobility form a bulwark between a despot and the people, but in a democracy they have no such office to perform, and are not a necessary class.

(*c*) *From Essay on Innovations.*—It is argued that it is foolish to decry all changes, for time itself works the greatest.

(*d*) *From Essay on Superstition.*—Atheism is declared to be better than superstition, as being no disturber of political or civic peace as superstition is.

9. How far is there any historic basis for the drama of Macbeth? What do you take to be the chief merits of the play; and what do you regard as its most powerful scenes and characters?

The single authority consulted by Shakespeare for this as for all other plays connected with the histories of England and Scotland, was Holinshead's 'Chronicle.'

The details of Duncan's murder are borrowed from the account of the murder of King Duffe by Donwald, especially as regards Lady Macbeth's influence and the slaying of the chamberlains, &c.

This history makes Banquo an accomplice, and therein the play differs, but agrees as regards Banquo's murder, Macduff's flight, the slaughter of his wife and children, his dialogue with Malcolm, and his killing Macbeth. The incident of young Siward's death is taken from the history of England.

The chief merit of the play is the graphic delineation of the gradual declension of Macbeth, and the slow weakening of Lady Macbeth's mind, the tampering with evil until it finally engulphed the palterer.

Its most powerful scenes are—the interview between the witches, Banquo, and Macbeth, between Macbeth and Lady Macbeth (Act I., Scene 7), Macbeth and the phantom dagger, the Ghost scene (Act III., Scene 4), between Macduff and Malcolm, Lady Macbeth with the taper, and Macbeth and the doctor.

10. Quote from the Play or the Essays any striking examples of the use of figurative language under the heads of (*a*) Simile, (*b*) Metaphor, and (*c*) Personification.

(*a*) *Simile:*

(1) 'Truth and falsehood in such things are like the iron and clay of Nebuchadnezzar's image.' (On Unity in Religion.)

(2) 'Dismayed not this
Our captains Macbeth and Banquo? Yes,
As sparrows eagles. (Act i., scene 2.)

(3) 'If he had been forgotten,
It had been as a gap in our great feast.' (Act iii., sc. 1.)

(*b*) *Metaphor:*

(1) They show Love to be the child of Folly.' (Of Love.)

(2) 'A man that studieth Revenge keeps his wounds green.' (Of Revenge.)

(3) 'Most sacrilegious murder hath broke ope
The Lord's anointed temple.' (Act ii., scene 3.)

(*c*) *Personification:*

(1) 'Superstition without a veil is a deformed thing.' (On Superstition.)

(2) 'No sooner justice had with valour armed
Compelled these skipping kerns.' (Act i., scene 2.)

(3) 'Vaulting ambition, which o'erleaps itself.' (Act vii., scene 1.)

Grammar and Composition.

SECOND YEAR.

Male Candidates.

1. Write in plain prose an essay on *one* of the following subjects:—

(*a*) 'Sit in your own place, and no man can make you rise.'

(*b*) The Mariners of England—

'Whose flag has braved a thousand years
The battle and the breeze.'

(*c*) '*The virtue of prosperity is temperance, the virtue of adversity is fortitude.*'

(*c*) This maxim of Bacon's is a particular enlargement of the old dictum of Aristotle that all virtue consists in a mean or middle state.

Not to be unduly elated and puffed-up by prosperity, not to be inordinately depressed or servile in adversity, are marks of a strong and equable mind, which in these respects may well be said to be virtuous.

The property of prosperity is to discover defects, of adversity to reveal good qualities; and so much the more does the sun of good fortune expose human frailties as its comfortable warmth renders people regardless of concealment.

But with adversity it is otherwise. Man is prone to oppress the unfortunate, neglectful of assisting him, ready to despise and misjudge him.

To inferior constituted minds how easy it is to sink under the shock of misfortune aggravated by human unkindness and suspicion!

The man who can bear unmoved the slings and arrows of outrageous fortune, and can show that patient merit which smiles at the contempt of the unworthy, surely, ranks high in the scale of being.

2. Paraphrase the second and one other of the following passages:—

(*a*) Now o'er the one-half world
Nature seems dead, and wicked dreams abuse
The curtain'd sleep; witchcraft celebrates
Pale Hecate's offerings; and withered murder,
Alarum'd by his sentinel, the wolf,
Whose howl's his watch, thus with his stealthy pace,
With Tarquin's ravishing strides, towards his design
Moves like a ghost.

(*b*) Far from the sun and summer gale,
In thy green lap was Nature's darling laid,
What time, where lucid Avon stray'd,
To him the mighty Mother did unveil
Her awful face: the dauntless Child
Stretch'd forth his little arms, and smiled.
'This pencil take' (she said), 'whose colours clear
Richly paint the vernal year:
Thine, too, these golden keys, immortal Boy!
This can unlock the gates of Joy;
Of Horror that, and thrilling Fears,
Or ope the sacred source of sympathetic Tears.'

(*c*) This supernatural soliciting
Cannot be ill, cannot be good—if ill,
Why hath it given me earnest of success,
Commencing in a truth? I am Thane of Cawdor:
If good, why do I yield to that suggestion
Whose horrid image doth unfix my hair,
And make my seated heart knock at my ribs,
Against the use of nature?

(*a*) At this time over this hemisphere no life is apparent, and evil visions disturb the security of repose. Now witches are abroad engaged in their unhallowed rites, and the lean assassin like a beast of prey lurks in lonely spots. With furtive pace, as the violator Sextus, he glides like a shadow upon his victim.

(*b*) In the centre of verdant England, away from southern heat and tempests, beside the clear and winding Avon, Nature's favourite, Shakespere, was born. She revealed herself to him even in childhood, and the fearless boy with pleasure discerned her wonders.

In return she endowed him with marvellous poetical faculties of description, so that he could vividly depict the changing seasons, excite pleasure, terror and piercing apprehension, and could cause the tears to flow in holy compassion.

(*c*) Is this more than human greeting—celestial or infernal? I cannot tell. It can scarcely be diabolic, for its predictions have come true so far that I have been created Thane of Cawdor. Yet how can it be from Heaven, since it causes me to yield to a temptation so frightful that the very thought of it makes my hair to stand on end, and my heart to palpitate in an extraordinary manner?

3. Explain the following:—Kerns and gallowglasses—with a new gorgon—the arm'd rhinoceros, or the Hyrcan tiger—the pit of Acheron—the English epicures—crown'd at Scone—nature's germins.

(*a*) *Kerns and gallowglasses.*—Kerns were light-armed troops having only darts, daggers, or knives. Gallowglasses had helmet, coat of mail, long sword and axe (Act. i., scene ii., line 13).

(*b*) *With a new Gorgon.*—Medusa, one of the Gorgons, was so hideous that every one who looked upon her head was changed into stone. She and her two sisters had hissing serpents instead of locks, and they possessed wings, brazen claws and enormous teeth (Act. ii., scene iii., line 53).

(*c*) *The armed rhinoceros, or the Hyrcan tiger.*—The rhinoceros is cased in the armour of an almost impenetrable hide. Hyrcania was a country south of the Hyrcanian Sea (Caspian), the tigers of which were fabled to be especially ferocious (Act iii., scene iv., line 101).

(*d*) *The pit of Acheron.*—Doubtless some deep cave reported to be connected with Hades. Acheron was in classical myths a river of the lower world, round which the shades hover and into which the Pyriphlegethon and Cocytus flowed. Acheron was also used as the name for all the infernal regions (Act. iii., scene vi., line 15).

(*e*) *The English epicures.*—Gluttony was a common charge brought by the Scotch against their wealthier neighbours (Act. v., scene iii., line 8).

(*f*) *Crowned at Scone.*—The stone seat on which the ancient kings of Scotland sat at their investiture was located at Scone in the neighbourhood of Perth. Brought originally from Iona, it was carried by Edward I. to England, and is enclosed in the coronation chair in Westminster Abbey (Act. v., scene viii., line 75).

(*g*) *Nature's germins.*—Nature's fruitful seeds, *c.f.* germs (Act. iv., scene i., line 59).

4. Explain the following passages, stating the circumstances under which they occur :—

(*a*) Where the Norwegian banners flout the sky
And fan our people cold.

(*b*) Augurs, and understood relations, have
By maggot-pies, and choughs, and rooks, brought forth
The secret'st man of blood.

(*c*) The wine of life is drawn, and the mere lees
Is left this vault to brag of.

(*a*) (Act i., scene 2, lines 49, 50).

The meaning is somewhat doubtful. *To flout* = to mock, to insult, and this would signify that the Norwegian banners triumphantly waved and chilled the Scottish courage.

Some scholiasts think that the passage represents the banners as captured and idly drooping. Ross coming from Fife announces Macbeth's victory over 'Sweno' to Duncan at the camp near Forres.

(*b*) (Act iii., scene 4, lines 124—127).

Augures = auguries = divinations ; *understood relations*, the connection between the omens and the crimes indicated by them ; *maggot-pies*, magpies.

It is worthy of note that the three birds mentioned are all noisy and somewhat ill-omened.

Murder will 'out,' however secretly committed.

These words are uttered by Macbeth, when after the 'Ghost scene' all are departed save the guilty pair.

(*c*) (Act ii., scene 3, lines 77, 78).

Lees = dregs at bottom of a cask, remaining after the clear contents have been bottled, &c.

vault = wine-vault, used metaphorically for the vault of the sky.

to brag of = to boast about.

The purity and enjoyment of life are gone, and have left nothing in the world to interest me.

Macbeth gave vent to the above expression just after the discovery of Duncan's murder.

5. Write notes on the following passages : —

(*a*) Cold is Cadwallo's tongue.

(*b*) Chill penury repressed their noble rage.

(*c*) How indigent the great,

(*d*) Grim-visaged comfortless despair.

(*a*) Cadwallo, Urien and Modred were Welsh bards, said to have been massacred by Edward I. on the shores of Carnarvon. Their tongues were silent in death, they sang no more.

(The Bard, line 29.)

(*b*) *Penury* (L. *penuria*) = poverty. Lack of means weighed down the inspiration of their genius. In Ode to Eton College, Gray speaks of 'Poverty with *icy* hand.' (Elegy, line 51.)

(*c*) *Indigent* (L. *indigens*) = needy, poor. The poet represents how badly off the mighty ones of the earth are, compared with his wealth who has at his command the treasures of poetry and the enjoyment of Nature.

(Ode 'On the Spring,' line 20.)

(*d*) *Grim* = stern, *visaged* (F. visage, L. visus = seeing) = faced ; grim-visaged is one of those compound adjectives that Gray particularly affected. *Despair* (L. *de* = from, *spero* = I hope), utter hopelessness.

6. (*a*) What, according to Bacon, are the four chief vices of authority?

(*b*) Explain the following :—(1) As there are mountebanks for the natural body, so there are mountebanks for the politic body. (2) Revenge is a kind of wild justice. (3) The advantages of simulation and dissimulation are three. (4) Generally it is good to commit the beginnings of all great actions to Argus with his hundred eyes, and the ends to Briareus with his hundred hands.

(*a*) (Essay 'Of Great Place.')—The vices of authority are chiefly four : delays, corruption, roughness, and facility.

(*b*) (1) A mountebank is really, as the name signifies, one who mounts a bench. The term was applied to quacks and charlatans who, having no fixed abode, mounted a bench in the market place to puff their nostrums. Just as there are 'Quack Doctors' so there are charlatan statesmen.

(Essay 'Of Boldness.')

(2) There is a rude equity in Retaliation.

(Essay 'Of Revenge.')

(3) *Simulation* (L. *similis* = like), assuming to be what one is not.

Dissimulation, assuming not to be what one really is.

Their three advantages are (*a*) to quiet opposition and to surprise, (*b*) to reserve a retreat, (*c*) to discover the mind of others.

(Essay 'Of Simulation and Dissimulation.')

(4) *Argus* was a monster of the old classic myths fabled to possess a hundred eyes. These were transferred to the peacock's tail. *Briareus*, another classic monster, who with his brothers assisted the gods when hard-pressed by the Titans.

Bacon says hereby 'That foresight and discernment are the best things in commencing any enterprise, but vigour and activity the most excellent in its execution.

(Essay 'Of Delays.')

7. Comment on the following passage from Mrs. Jameson's criticism of Lady Macbeth :—

'She is a terrible impersonation of evil passions and mighty powers, never so far removed from our own nature as to be cast beyond the pale of our sympathies; for the woman herself remains a woman to the last, still linked with her sex and with humanity.'

This appears to be a fair estimate of Lady Macbeth's character. She was intense in her ambition, urgent with her husband in the perpetration of Duncan's murder (even ready to commit the deed herself), deep in her remorse to the extent of unhinging her reason and sapping her vitality.

Her powers of decision, of control, of contriving, and of defying suspicion were very great.

Yet with all her passions, all her disregard of right, all her carelessness of reputation, her pathetic and deep-seated remorse somewhat redeems her womanhood.

Never has Shakespeare's art been so completely displayed as in preserving his delineation of Lady Macbeth within due limits. An inferior dramatist would have made her diabolical, and while exciting our wonder and disgust would have enfeebled our interest and utterly alienated our sympathies.

Male Candidates.

FIRST YEAR.

English History.

(TWO *hours and a* HALF *allowed for this paper.*)

(Candidates are not permitted to answer more than EIGHT questions.)

1. *With what objects* were the following measures agreed to :—Constitutions of Clarendon, Provisions of Oxford, Triennial Act, the 'Clarendon Code,' Toleration Act, Septennial Act? Give the dates. Do *not* give their provisions.

(*a*) *The Constitutions of Clarendon* (1164) aimed at preventing (1) the English Clergy becoming denationalised and constituting a social caste with exclusive privileges, and (2) the excessive interference of the Pope in English affairs.

(*b*) *The Provisions of Oxford* (1258), passed by the Mad Parliament, promoted the devolution of power towards the democracy, and secured the investigation of wrongs committed by the king's officials.

(*c*) *The Triennial Act* (1694) was passed with the view of bringing the Parliament more frequently into touch with the nation, and of rendering members more dependent upon their constituencies. The chance of such tyranny as that of the Long Parliament was thereby thought to be obviated.

(*d*) *The Septennial Act* (1716). As there was a rebellion in favour of the old Pretender the year previously, it was thought that the popular mind was too unsettled safely to employ the suffrage immediately.

2. What events are connected with the following persons:—Stephen Langton, Earl of Somerset, George Monk; the following places:—Evesham, Sluys, Tewkesbury, Dunbar, Torres Vedras; and the following dates:—1715, 1745, 1801, 1805, 1815?

(*a*) *Stephen Langton.*—Signing of Magna Charta (1215).
(*b*) *Earl of Somerset.*—The murder of Sir Thomas Overbury (1615).
(*c*) *George Monk.*—The restoration of Charles II. (1660).
(*d*) *Evesham.*—Death of Simon de Montfort in battle against Prince Edward (1265).
(*e*) *Sluys.*—Great naval victory in the Channel over the French (1340).
(*f*) *Tewkesbury.*—Defeat of Margaret by Edward IV. (1471).
(*g*) *Dunbar.*—Defeat of the Scotch under Leslie by Cromwell (1650).
(*h*) *Torres Vedras.*—Construction of impregnable 'Lines' by Wellington, whither he retreated (1810).
(*i*) Rebellion in Scotland on behalf of 'Old Pretender' (1715).
(*j*) Rebellion in favour of 'Young Pretender' (1745).
(*k*) Union of Great Britain and Ireland, Battle of Copenhagen (1801).
(*l*) Battle of Trafalgar and death of Nelson (1805).
(*m*) Battle of Waterloo (1815).

3. Give a short account of the career of the Earl of Strafford from the time that he joined the king. When, and for what purposes, were the Star Chamber and Court of High Commission appointed? Show how the monarchy, when restored in 1660, differed from that of 1625.

(*a*) In 1628 Thomas Wentworth joined the party of Charles and was created Baron, and soon after Viscount and a Privy Councillor. As President of the Council of the North, he contemptuously violated the Petition of Rights, Magna Charta, and the other safeguards of English liberty. In 1633 he was appointed Lord Deputy of Ireland and there he completely succeeded in establishing the absolute power of his master. Summoned to England in 1640 to take the field against the Scots, he was unable to effect anything on account of the dislike of the army. Yet he formed a scheme called 'The Thorough' to subject England to despotism, but was impeached by Pym and in 1641 was beheaded.

(*b*) *The Star Chamber* consisted of the Chancellor, the Treasurer, the Lord Steward, Lord Marshal and other high officers of state. It was developed by Henry VII. as a kind of state criminal department, but it soon became the odious instrument of an arbitrary power. It claimed both judicial and executive authority. It fined, imprisoned, mutilated and extorted 'benevolences.' Under Charles I. it was especially active until the assembling of the Long Parliament, when its victims were released, &c., and the Court itself dissolved (1640).

(*c*) *The Court of High Commission* arose in the reign of Elizabeth and was a growth of the Queen's supremacy as Head of the Church. It possessed an unlimited power in religious matters (which was vested in the hands of Churchmen), and could make enquiries by any means which its Commissioners should devise. It was abolished in the same way and at the same time as the 'Star Chamber.'

(*d*) The monarchy of 1660 differed from that of 1625 in that the restored prerogatives of the king could only be exercised through responsible ministers possessing the confidence of the Commons. Further, the pecuniary incidents of the Feudal System were abolished and an excise granted by Parliament was substituted.

Thus, both as regards administration and revenue, the sovereign was brought more directly under the control of the Commons.

4. What were the claims of Henry IV., Mary Queen of Scots, and George I., to the throne? Give, with dates, a brief account of the reign of Henry VII., *or* show what connection existed between the Black Death, the Statute of Labourers, and Wat Tyler's Rebellion.

(*a*) Henry IV. claimed the throne by a very remarkable declaration, in which an insinuated priority of descent from Henry III., a right of conquest, and the misgovernment of Richard II. are artfully combined.

Mary Queen of Scots was great grand-daughter of Henry VII. and would have been the rightful Queen of England if the illegitimacy of Elizabeth had been allowed.

George I. was the great grandson of James I. and being the nearest Protestant heir succeeded to the throne, excluding the Pretenders, the House of Savoy and other more nearly related elder branches. Parliament had in 1701 so determined the succession by the 'Second Act of Settlement.'

(*b*) *The Black Death* of 1348 by greatly reducing the number of enfranchised labourers nearly doubled the recompense of their work. This was a great loss to landlords, who procured two 'Statutes of Labourers' in 1349 and 1351 to be passed. The first forced labourers to work at ordinary wages for any one requiring them, the second fixed those wages. The great hardship and dissatisfaction thereby caused needed but a spark to enflame it into revolt, and the match was applied by the Poll Taxes of 1379 and 1380. It is almost certain that many free men were thus re-enslaved. Hence Wat Tyler's rebellion.

5. What part was taken in the history of the Church in England by Wicklif, Thomas Cromwell, Cranmer, Laud, Wesley? When did the terms 'High Church' and 'Low Church' come into use, and what did they then mean?

Wicklif. In 1372 he lectured upon the impositions of the friars and two years later was appointed Royal Commissioner to meet the Pope's nuncios at Bruges to treat respecting papal abuses. Being installed into the rectory of Lutterworth he sent forth bands of 'Poor Priests,' who everywhere denounced the luxury of monks, and the inefficiency of the clergy in general. His great work was the translation of the Bible into the vernacular. He rejected transubstantiation, auricular confession, celibacy of the clergy, papal infallibility and secular supremacy.

Thomas Cromwell was appointed by Henry VIII. Vicar General and Vice-regent in all religious matters. He issued orders enjoining the clergy to preach the king's supremacy, to remove images from their altars, and to promote the religious education of all young persons, teaching them the Lord's Prayer, the Ten Commandments, and the Apostle's Creed. Partially through his reports the monasteries were suppressed, and by his direction every parson had to set up a Bible in his church for the perusal of the people.

Cranmer, created Archbishop of Canterbury (1533), more than any one else moulded the Reformation in its Articles, Liturgy, Homilies, and Catechism, and had his power been equal to his will some of its worst features would have been absent. After a vacillating course he ended life firmly and nobly at the Marian stake.

Laud was one of those fierce Anglicans whose persecuting intolerance in the Court of High Commission and elsewhere drove the nation into Puritanism. By his advice a 'Service Book' was endeavoured to be forced upon the Scottish Church, a measure which eventually in no small degree tended to the triumph of the Parliament.

Wesley originated his 'Societies' in 1739, when the Church of England, though sound in doctrine, was in a dull lethargy. His field-preaching brought the gospel home to the poor and stirred up the English clergy. Great as is the work of the Methodist Societies, their greatest glory and achievement is that they reanimated the Mother Church. The terms High and Low Church were first heard in connection with the trial of Dr. Sacheverell in 1710, and in 1714 the cry 'High Church and Ormond' was raised. The High Church was that section that execrated the Revolution and maintained the doctrine of non-resistance. The Low Church was in favour of the 'Protestant Succession.'

6. Describe the relations between England and Scotland under Edward I. and Henry VIII. How did the course of the Reformation affect the power of the crown in the two countries? What did James I. mean when he said 'No Bishop, No King!'?

(*a*) Edward I. claimed to be the feudal superior of the Scottish king, and from 1286 to the end of his life (1307) he was engaged more or less in hostilities to enforce that claim.

Henry VIII. was at war with Scotland (united with France) three times during his reign. On the first occasion Henry VIII. detained the jewels of his sister the Queen of Scotland, and her husband, James I., invading England, was killed at Flodden (1513). The second time Scotland was simply an auxiliary of France, and the third time ecclesiastical differences and French influence were the causes of quarrel. In the 'Rout of Solway' 10,000 Scots fled before a few English horsemen rather than serve under a favourite of the king's.

(*b*) In England the king's power was increased by the Reformation. He was recognised as Head of the Church and was enriched by the forfeited church lands.

In Scotland the Reformation was more violent and democratic, the power of the king and of the pope being alike attacked. The Scottish hierarchy was abolished and the monarch himself dictated to. It was this experience that led James to say, [If there be] no bishop [there will be] no king.

7. Describe shortly the circumstances which tended to strengthen the position of James II. at the beginning of his reign. Name the principal Acts by which he lost that position, and show how the Declaration of Rights prevented the recurrence of such conduct.

James II. was strengthened at the beginning of his reign by the ascendancy which Charles II. bequeathed to him, by the flight of the opposition leaders, by pecuniary help from France, by public sympathy reacting in his favour, by the standing army which he possessed and by the favour of the great majority of the Church of England.

He lost his advantageous position by the cruel suppression of Monmouth's rebellion, the attack upon the universities, his violation of municipal rights, his declarations of indulgence, and by the Trial of the Bishops.

The 'Declaration of Rights' disposed of the 'Suspending and Dispensing Powers of the king' and the existence of a standing army, and asserted the rights of petitioning and free election of Parliament.

8. Explain shortly the circumstances which led to the formation of the Quadruple Alliance against Louis XIV. at the close of the Reign of William III. Why is Blenheim regarded as one of the *decisive* battles of the world? State the principal conditions of the Peace of Utrecht.

(*a*) Charles II. of Spain being without lineal heirs, Louis XIV. of France claimed the succession in right of his wife Maria Theresa, sister of Charles, though on his marriage there had been a formal renunciation of any such claim.

To preserve as much as possible the balance of power, William opened negotiations with Louis, and two 'Partition treaties' were agreed upon, the latter of which stipulated that the Archduke Charles of Austria should take Spain. But on the death of Charles, who under French coercion had made a will in favour of Louis' grandson Philip, this latter succeeded to the Spanish crown, and the Quadruple Alliance was formed against Louis and Philip (1701).

(*b*) By the victory of Blenheim (1704) the Emperor of Germany, who was hard pressed by the Elector of Bavaria and the French, was relieved, and all Bavaria was reduced. A *decisive* reverse would probably have resulted in Spain, Austro-Germany, Italy and France being subject to the will of the latter country, and a power fatal to European independence would have been created.

(*c*) By the treaty of Utrecht (1713) France engaged to acknowledge the 'House of Hanover,' to desert and exile the Pretender, perpetually to sever the crowns of France and Spain, to demolish the fortifications of Dunkirk and to fill up its harbour, to cede Hudson's Bay, to acknowledge our right to Nova Scotia, Newfoundland and St. Christopher. The French were to have certain fishing rights.

Spain agreed to cede to England Minorca and Gibraltar—to the Emperor, Naples, Milan, Sardinia and the Spanish Netherlands—to the Duke of Savoy, Sicily.

Subsequently England obtained the Assiento or contract for supplying the Spanish Colonies in South America with 4,800 negroes annually for thirty years.

9. Give an account of Walpole's administration after the death of George I. Show that he is remarkable for what he *prevented*. What personal defects and what external circumstances combined to bring about his fall? How did he prepare the way for Pitt?

After the death of George I. (1727) Walpole became supreme in the government, and continued premier for nearly fifteen years. In 1729 he concluded the important treaty of Seville with Spain, and in 1733 brought forward his great and able Excise Scheme, which unfortunately had to be abandoned on account of the most virulent opposition.

In 1739 he was forced against his will into a war, not altogether just, against Spain, and in 1742 he resigned office.

For a considerable time Walpole had maintained his majority by corrupt means, but such practices had been customary and continued even after his time.

His fall was accelerated by his lack of firmness and his loose, pecuniary morality combined with the comparative disasters of the Spanish War.

His financial policy, his long tenure of office, and the tolerant breadth of his measures, made him an effective forerunner of the Pitts.

10. What extension of our Colonial Empire took place during the reign of George II.? Describe the events of 1759. What do you understand by the phrase 'The Hundred Years' War for the Possession of the New World'?

In 1759 Canada capitulated, and in 1757 was fought the battle of Plassey, which secured to us Bengal.

In 1759 Rodney bombarded Havre, Boscawen defeated the Toulon fleet in Lagos bay, and Hawke captured six French ships in Quiberon Bay. On land, in Canada, Ticonderoga, Montreal, and finally Quebec were reduced and Guadalopue (West Indies) captured. In India, Coote took Wandewash, and in Germany our ally Frederic won the great victory of Minden. 'The Hundred Years' War for the possession of the New World' is a term employed to denote the struggles between the French and English in North America.

From the time of the settlement of Virginia, 1607, until the conquest of Canada, 1759—60, there was constant border warfare between the rival colonies. The struggles were more serious after the Puritan emigration of New England, and repeatedly embroiled the mother countries.

11. Explain clearly the leading causes of the separation of the American colonies from England. Give, with dates, the principal events of the war; and state the conditions of the Treaty of Versailles, which concluded it.

(1) The leading causes of American separation were:—

(*a*) No further need of English protection existed after the expulsion of the French.

(*b*) The American political and religious temperament was more democratic than the English.

(*c*) The commercial interests of America were not always identical with those of England.

(*d*) The attempt to tax, by means of a stamp act, the colonies internally without giving them imperial representation.

(2)

The Affair of Lexington	1775.
Battle of Bunker's Hill	1775.
Invasion of Canada	1775.
Evacuation of Boston	1776.
Battle of Brandywine	1777.
Surrender of Burgoyne	1777.
Evacuation of Philadelphia... ...	1778.
Hanging of Major André	1780.
Surrender of Cornwallis	1781.
Treaty of Versailles	1783.

(3) The terms of the Treaty of Versailles (1783) were as follows:—

(*a*) To *America* we guaranteed independence, with a right of fishing off the banks of Newfoundland.

(*b*) To *France* we granted a share of the Newfoundland fishery and surrendered St. Pierre, Miquelon, Senegal, Goree, Pondicherry, Chandernagore, and made a disadvantageous exchange in the West Indies.

(*c*) To *Spain* we restored Minorca and both the Floridas.

12. (*a*) Of what importance is Egypt to Great Britain? Under what circumstances have we at various times come into contact with France there? What circumstances have led to our present occupation of the country?

(*b*) What is meant by 'Imperial Federation'? What advantages or disadvantages do you see in Australia or Canada becoming independent of the mother country?

[Answer either (*a*) or (*b*), not both.]

By Imperial Federation is meant the closer union of the British Empire for Imperial purposes on terms of a more equal status than at present obtain. There would doubtless be a Federal Parliament and Exchequer to which the various States would send representatives and contributions, and probably a common army and navy in addition to local ones. The scheme being as yet in mere embryo, men's conceptions as to its details and even important principles are considerably varied.

The principal advantages accruing to Great Britain from the independence of Australia or Canada would be freedom from our present responsibility for their defence, and there would also be less chance of their entangling us in disputes with other nations.

The disadvantages would mainly be—that restrictions might be imposed upon our trade, and that our emigrants would be rejected, whilst the load of our national debt would remain the same.

N.B.—The writer of these answers desires emphatically to state that it was impossible for any student to answer only fairly well, in the given space, the maximum number of questions allowed.

Female Candidates.

FIRST YEAR.

Grammar and Composition.

1. A SUMMER HOLIDAY.

To everyone cessation from toil, and a period devoted to recreation, is absolutely necessary if the largest amount and the highest quality of work is to be obtained. Moreover, everybody knows that pleasure is a great restorative, and that a holiday thoroughly enjoyed is more beneficial than one simply allowed to slip away.

Further, summer is particularly the time for pleasure, and although we do not belittle the joys of skating and the robust enjoyment of the wintry blast sturdily endured, yet pre-eminently the season of leafy trees, of blooming meadows, of clear running streams, of serene skies and sleeping winds, is marked out for holiday happiness. Who that has sojourned for some summer days by the sea at a place chosen for its conjunction of inland charms and marine attractions will ever forget it?

The memory thereof is treasured up as a bright oasis in life's desert, as one of the nuggets drawn from the sands of time.

The curves of the shores, the aspect of the opposing hills, the fleeting boats and the active men, the resplendent water and the azure sky penetrate into the depths of being until we can find a rapture even on the lonely shore, society and music in the billows' roar, and feel akin to the mystery of the Universe.

2. *Parse the sentence—*

There have been tears and breaking hearts for thee,
And mine were nothing had I such to give.

There—introductory adv.
have been—verb, subst., indic., perfect, plural, 3rd pers., agrees with its subjects *tears* and *hearts*.
tears—com. noun, plural, 3rd pers., neuter, nom. subject to *have been*.
and—conjunction, copulative joins *tears* and *hearts*.
hearts—com. noun, plural, 3rd pers., neuter, nom. subject to *have been*.
for—prep., governs *thee*.
thee—personal pron., sing., 2nd pers., common gend., objective governed by *for*.
And—conjunction, copulative, joins the two sentences '*There have been, etc.*,' and '*mine were nothing*,' etc.
mine—personal possessive pronoun, plural, 1st pers., common gend., nom., subject to *were*.
were—verb, substantive, subjunctive, past indefinite, plural, 1st pers., agrees with its subject *mine*.
nothing—common noun, sing., 3rd pers., neuter, nom. case, subject after *were*.
had—verb, regular (weak), transitive, act. voice, subjunctive mood, past indefinite, singular, 1st person, agrees with its subject *I*.
I—personal pron., singular, 1st person, common gend., nom. case, subject to *had*.
such—demonstrative pronoun, plural, 3rd pers., neuter, objective, governed by *had*.
to give—verb, irregular (strong), transitive, act. voice, gerundial, infinitive, present tense, qualifies *such*.

3. *Explain fully the metrical structure of the following stanza. Scan the last three lines, and mention any other English poems which are written in the same metre.*

'Lake Leman woos me with its crystal face,
The mirror where the stars and mountains view
The stillness of their aspect in each trace
Its clear depth yields of their far height and hue;
There is too much of man here to look through
With a fit mind the might which I behold;
But soon in me shall loneliness renew
Thoughts hid, but not less cherished than of old,
Ere mingling with the herd had penned me in their fold.'

This stanza is formed of nine lines, the first eight being Iambic pentameters and the last line an Alexandrine. The rhyming lines are in this kind of verse always the first and third, the second, fourth, fifth and seventh, and the sixth, eighth and ninth.

Spenser wrote his 'Faërie Queen,' Kirke White his 'Christiad,' Shelley his 'Adonais' in this measure.

The smallest recurring combination of syllables is called a foot.

An Iambic foot is one containing two syllables—a short and long one.

A pentameter is a line containing five feet.

An Alexandrine is an Iambic hexameter, and is employed at the end of pentameter stanzas to relieve the monotony.

A hexameter is a line containing six feet.

Scanning

Bŭt soōn | ĭn mē | shăll lōne | -lĭ-nĕss | rē-nĕw |

Thoŭghts hĭd | bŭt nōt | lĕss chĕr | -ĭshed thān | ŏf ōld |

Erĕ mĭng | -lĭng wĭth | thĕ hĕrd | hăd pĕnned | mĕ ĭn | theĭr fōld |

4. *Analyse fully the last five lines of the preceding stanza.*

SENTENCE.	CONNECTIVE.	SUBJECT.			PREDICATE.			OBJECT.		
		SIMPLE.	ENLARGEMENT.		SIMPLE.	EXTENSION.		SIMPLE.	ENLARGEMENT.	
A There is too much of man ...behold	there	much	too of man to look through .....behold		is	here		which		
A2 which I behold	...	I	...		behold	...		...		
B But soon in me shall loneliness renew ..... fold	But	loneliness	...		shall renew	soon in me		thoughts	hid not less cherished than ..... fold	
B2 Ere mingling with the herd ..... fold	Ere	mingling	with the herd		had penned	in their fold		me		

Kind of Sentence.—A, Principal; A2, Adj. to *much*; B, Principal; B2 Adverb. mod. *cherished*.

5. *Give the etymology of the following words, and say precisely in what sense Byron uses them:—precipitous, ghastly, Draconic, unenviable, antithetically, innate, philosophy, sovereignty, trophied, contentious, sophist, irony.*

WORD.	STANZA AND LINE.	ETYMOLOGY.	BYRONIC SENSE.
Precipitous(ly)	Stanza 86, Line 5	*praecipito* = I cast headlong (L.) *prae* = before, *caput* = head.	almost perpendicularly.
Ghastly	,, 31, ,, 2	*gast* = a spirit (A.-S.)	fearful.
Draconic	,, 64, ,, 9	*Draco* = a Greek law-giver.	sanguinary.
Unenviable	,, 43, ,, 7	*un* = not, *envier* = to grudge (Fr.)	not fit to be envied.
Antithetically	,, 36, ,, 2	*invideo* = I envy (L.) *anti* = against, *thesis* = a placing (Gr.)	with opposing qualities.
Innate	,, 39, ,, 2	*in* = in, and *natus* = born (L.)	congenital, native.
Philosophy	,, 39, ,, 2	*philos* = loved, *sophos* = wisdom (Gr.)	equanimity.
Sovereignty	,, 19, ,, 4	*souverain* = supreme (Fr.)	self-mastery.
Trophied	,, 17, ,, 4	*supra* = above (L.) *trophaion* = sign of victory (Gr.)	set-up and engraved as a trophy.
Contentious	,, 69, ,, 9	*contendere* = to strain violently (L.)	quarrelsome.
Sophist	,, 77, ,, 1	*sophos* = wise (Gr.)	specious reasoner.
Irony	,, 107, ,, 6	*eiron* = a dissembler in speech (Gr.)	Sneering under the guise of compliment.

6. *Reproduce, in your own words, Byron's estimate of the character of Napoleon, Rousseau, or Gibbon.*

N.B.—The character of Napoleon is depicted by Byron in Stanzas xxxvi. to xlii. (inclusive) of Childe Harold. It is somewhat too favourable, as it was written before the ex-Emperor's peevish behaviour at St. Helena.

His character was composed of extremes and of antagonist qualities. He was both magnanimous and mean, contemptuous of men yet led by their flattery to deem himself almost divine. In truth he sometimes soared higher than human nature and at other times his actions disgraced it. He could read the inner motives of men, but deceived himself; and although he could conquer empires was occasionally the slave of the pettiest passions.

The quiet of peace was a torment to him, and he lusted for war and fame; nevertheless he bore his misfortunes and ruin with scornful equanimity.

7. *What light is thrown, in the poem of Childe Harold, on Byron's own character and personal history? Give quotations or references to passage in illustration of your answer.*

The many-sided and antithetical nature of Byron is fully revealed in the whole of Childe Harold and fairly well even in Canto III. alone.

Of his personal history we learn comparatively little. In Stanzas i., cxv., cxvi., he mentions his daughter and his travels, and in various passages he reveals the spots he has wandered and the scenes of his residence (xxx., lxviii., lxxi., and Song of Drachenfels).

In multitudinous places stands forth confest his habits of solitary contemplation; and his family misfortunes are spoken of in verse cxvii.

Byron himself was a king among men, and a sun among the stars of genius; but his nature was warped, his brilliance dimmed, and his purity befouled, through the cruel repulse of his affections by those who should have repressed his eccentricity, soothed his melancholy and repaid his love. That he was affectionate is shown by his commencing and concluding this canto with references to his daughter, and by the touching mention of his kinsman Major Howard, who fell at Waterloo.

His was an independence of character (cxiii.), and a passion for freedom (lxiii., lxiv.), fostered by the consciousness of inherent genius (vi.), and a hatred of conventionality (xv.). His mind was subtle, introspective, and discerning (iv., xxxvi., xc.), but with a leaning to fatalism (ii.), mysticism (vi.), and fancifulness (xcvii.), tempered by yearnings after the security of faith (cxiv.), an ecstatic love of nature (xiii., lxviii., lxxii., lxxv., xcvi., cix.), and a lurking suspicion of the eccentricity of his disposition (iii., vii., lxxx., lxxxi.).

These mental features wrought in Byron a hopelessness (iii., xxxiv., xxxv.), and a desire to sojourn apart with his thoughts (lxxi., lxxii.).

The personal revelations of this poem must excite in any thoughtful and sympathetic mind feelings of admiration, wonder, regret, and pitiful love for the gifted and erring poet.

8. *Explain the following phrases and allusions:—*

(*a*) *The fabled Cytherea's zone.*
(*b*) *The Pythian's mystic cave of yore.*
(*c*) *The blue rushing of the arrowy Rhone.*
(*d*) *Ehrenbreitstein with her shattered wall.*
(*e*) *Brunswick's fated chieftain.*
(*f*) *A sword,*
Such as Harmodius drew on Athen's tyrant lord.

(*a*) Cytherea was another name for Aphrodite or Venus, the goddess of love. Her zone or belt conferred upon any wearer of it the power of becoming the object of love and desire.

(*b*) Pythius was a surname of the Delphic Apollo. Within the cave at Delphi, sitting upon a tripod over a crevice emitting mephitic vapours, the Pythian priestess delivered mystic oracles.

(*c*) At Geneva the Rhone is blue to a depth of tint nowhere else equalled in fresh water, and its current is rapid enough to be compared to an arrow's flight.

(*d*) Ehrenbreitstein is an important fortress on a rock 370 feet high, overhanging the Rhine opposite Coblentz. For lack of provisions it surrendered to the French in 1800, and its walls were blown up in 1801.

(*e*) 'Brunswick's fated chieftain' was Duke Freidrich William, fourth son of Duke Karl Wilhelm Ferdinand. The whole family strove with all the powers of their being against the despotism of Napoleon and for the liberation of Germany. The father was mortally wounded at Auerstädt and the son was killed at Waterloo.

(*f*) Harmodius was a noble Athenian who, B.C. 514, together with Aristogiten, slew Hipparchus, one of the despots of Athens. He was immediately slaughtered by the escort.

9. *Macaulay says of Byron:—'All the fairies save one had been bidden to his cradle.' What is meant by this statement? Can you illustrate it and explain it by reference to the facts of the poet's life?*

There is a pretty fairy tale applied by the Duchess of Orleans to the character of her son, which relates how at the 'christening' of a prince, all the fairies were invited save one who was unluckily forgotten. The fairies attended and each as a gift bestowed a blessing, but the uninvited one suddenly appeared, and though her malignancy could not revoke the bestowed benisons, yet with each she mingled a curse. So it was with Byron. Macaulay proceeds to say:—

Antitheta.

1. He was born to all that men covet and admire.	1. *But* in every one of those eminent advantages was mingled something of misery and debasement.
2. He was sprung from a house, ancient indeed and noble	2. *But* degraded and impoverished by a series of crimes and follies.
3. The young peer had great intellectual powers.	3. *But* there was an unsound part in his mind.
4. He had naturally a generous and feeling heart.	4. *But* his temper was wayward and irritable.
5. He had a head which statuaries loved to copy.	5. *But* a foot, the deformity of which the beggars in the street mimicked.

10. *What were Byron's views about the school of poets of which Pope was the most prominent representative? Show how far and in what poems Byron imitated Pope, and in what particulars his own writings differed from that model.*

Byron had an extravagantly exalted opinion of the merits of Pope as a poet. He classes him in 'English Bards and Scotch Reviewers' along with Milton, and declares in a letter that he prefers his translation of the Iliad to the original, whilst on another occasion he hints, but dare not say outright, that he is Shakespere's equal. The age of Pope he compares to that of Horace, and asserts that his school vies with the Augustan one.

Byron imitated Pope's Dunciad in 'English Bards and Scotch Reviewers,' and closely copied his versification in the Corsair and Lara. The satire and form of these poems closely resemble his models, and quite equals them in terseness of expression and smoothness of versification. But in truth, Dr. Johnson's famous comparison of Pope and Dryden would apply almost equally well to Pope and Byron. The one is the more correct, the other the more poetic; the one never descends so low, but the other rises higher. Pope has not many mean poems, but Byron has numerous noble verses. Pope remains always upon a plateau; Byron explores both Alpine heights and Stygian depths. The former clings more closely to a fore-determined plan; the latter gives range to an erring and vagrant fancy.

Female Candidates.

FIRST YEAR.

English History.

(Three *hours allowed for this Paper.*)

No candidate may answer more than EIGHT questions.

1. Mention the most famous Archbishops of Canterbury since the Conquest, and give a short account of two of them.

(*a*) Lanfranc, Anselm, Becket, Langton, Cranmer, Laud, were the most important Archbishops of Canterbury from the Conquest to the Restoration. Since the latter events the archbishops have been of little political importance.

(*b*) *Lanfranc* was a native of Pavia, who in consequence of his great learning and controversial skill was, having passed into Normandy, appointed by the Duke William, Abbot of St. Stephen's, Caen. After the conquest of England he became Primate, and he frequently employed his influence to support justice and protect the native English. To him the See of Canterbury owes the greater part of her possessions, which he wrested from the tenacious grasp of the conquerors.

(*c*) *Laud* was educated at Oxford, obtained high preferment from James I., and was by Charles I. appointed Archbishop of Canterbury and one of his chief advisers. By means of the Court of High Commission he severely persecuted the Puritans, Leighton, Prynne, Burton, &c., suffering severely. He was a typical but extreme High Churchman, and earned the reputation of being a Jesuit. Together with Strafford he laboured to make the king absolute, and zealously he preached the doctrine of Passive Obedience. In 1640 he was impeached of High Treason by the Commons, was imprisoned until 1645 and then executed.

2. Give short biographies of *any two* of the following persons:—Roger Bacon, Simon de Montfort, the Black Prince, Caxton, Sir Thomas More, Sir Francis Drake.

(*a*) *Roger Bacon* was an eminent monk and philosopher of the 13th century. He spent many years in making experiments in chemistry and natural philosophy, and was the most learned man that England had hitherto produced. Many of his discoveries paved the way for the most useful modern inventions, but procured him only persecution and ten years' imprisonment. He is said to have invented gunpowder, magnifying glasses and telescopes. He died in 1392.

(*b*) *Sir Francis Drake* was a celebrated admiral of Elizabeth's reign who spent nearly all his life in active and intense hostility against the Spaniards. He made a voyage round the world, returning in 1580, when Elizabeth knighted him. He plundered the Spanish West Indies and brought from Virginia the potato. In 1587 he 'singed the king of Spain's beard' by burning 100 of his ships in Cadiz Harbour. This delayed the Armada an entire year, and gave aroused England time for successful defence. The following year he materially assisted in defeating the Armada, and died seven years afterwards.

3. Trace, by a genealogical table, the descent:—

(*a*) Of Edward III. from William the Conqueror, *or*

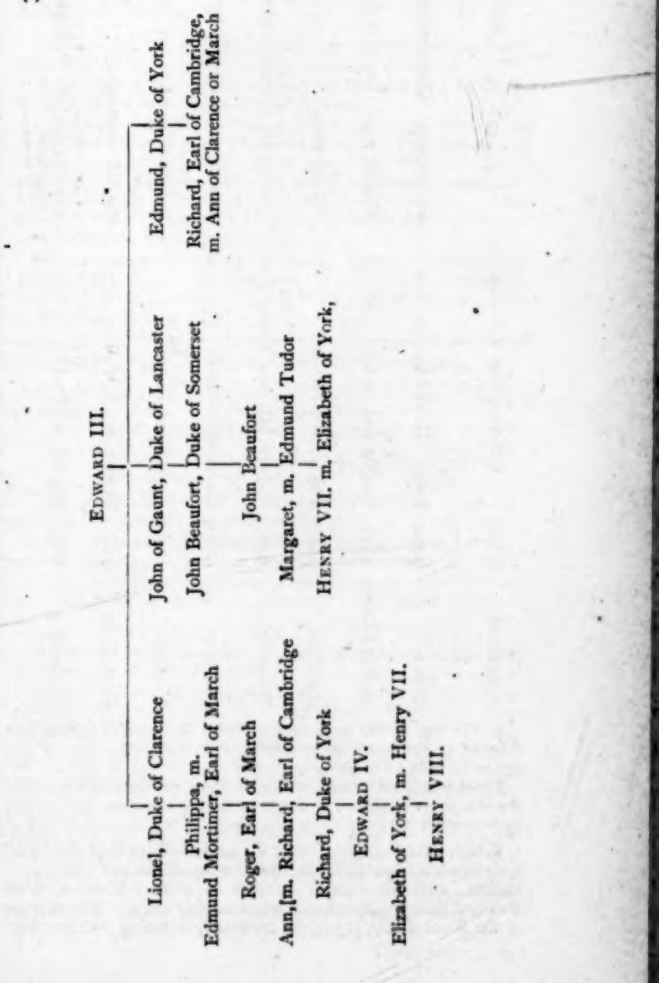
(*b*) Of the Tudors from Edward III., *or*

(*c*) Of George I. from Henry VII.

(*a*)

William the Conqueror
Henry I.
Matilda
Henry II.
John
Henry III.
Edward I.
Edward II.
Edward III.

(*b*)


EDWARD III.
Lionel, Duke of Clarence
Philippa, m. Edmund Mortimer, Earl of March
Roger, Earl of March
Ann, m. Richard, Earl of Cambridge
Richard, Duke of York
EDWARD IV.
Elizabeth of York, m. Henry VII.
HENRY VIII.
John of Gaunt, Duke of Lancaster
John Beaufort, Duke of Somerset
John Beaufort
Margaret, m. Edmund Tudor
HENRY VII. m. Elizabeth of York,
Edmund, Duke of York
Richard, Earl of Cambridge, m. Ann of Clarence or March

(*c*)

HENRY VII.

Margaret, m. James IV. of Scotland

James V. of Scotland — Margaret (by Earl Douglas)

Mary, Queen of Scots — Earl Darnley

JAMES I.

Elizabeth, m. Frederic, Elector of Palatine

Sophia, m. Ernest Augustus, Elector Hanover

GEORGE I.

4. When, between what parties, and with what results, were the following battles fought—Lewes, Neville's Cross, Agincourt Bosworth, Zutphen, Ramilies, Porto Novo, Talavera?

BATTLES.	DATES.	CONTENDING PARTIES.	RESULTS.
——	——	——	——
Lewes	1264	Henry III. and Barons	Barons won. Great constitutional progress.
Neville's Cross	1346	English and Scotch	English won. David of Scotland captured.
Agincourt	1415	English and French	English won.
Bosworth	1485	Richard III. and Henry Tudor	Richard III. defeated and slain. Accession of Tudors.
Zutphen	1586	Dutch and Spanish	Indecisive. Sir Philip Sydney killed.
Ramilies	1706	English and French	French defeated.
Porto Novo	1781	English and Mysoreans	English victorious.
Talavera	1809	English and French	French defeated. Portugal secured. English prestige restored.

5. 'It was in the preaching of John Ball that England first listened to the knell of feudalism, and the declaration of the rights of man.'

Explain this statement, and give some particulars respecting the industrial condition of England during the latter half of the 14th century.

Between the Conquest and 1381 many villeins had purchased their freedom from the feudal lords, many others had been copyholders, and many more dwellers in cities. Most of these obtained their livelihood as a wage-earning class. The ravages of the Black Death (1349) by materially reducing their numbers added to their industrial value. The higher wages obtainable were sought to be lowered by repressive enactments, both as regards the locality of labour and its remuneration. (See Statutes of Labourers, 1349 and 1351.) The imposition of a poll-tax was the last straw, and in 1581 the oppressed rose in rebellion, headed by Wat Tyler and John Ball, an excommunicated priest. The latter sounded the knell of feudal servitude and proclaimed the doctrine of individual rights by preaching upon the text,

'When Adam delved and Eve span
Who was then the gentleman?'

The poor labourers were almost entirely in the right; they simply demanded:—

(*a*) The abolition of slavery;
(*b*) The reduction of rent to 4s. per acre;
(*c*) Liberty to buy and sell in all fairs and markets; and
(*d*) An amnesty for themselves.

6. Say what you know of *any two* of these—(1) Constitutions of Clarendon, (2) the Statute of Labourers, (3) Poyning's Law, and (4) the Bill of Rights.

(*a*) *The Constitutions of Clarendon* (1164) consisted of sixteen articles by which it was sought to limit the power of the Pope in England, and to reduce the peculiar rights of the clergy within due limits. The principal provisions were as follows:—

(1) Clergy when charged with crimes should be tried in the civil courts;
(2) No churchman of rank should quit England without royal permission;
(3) All vacant benefices were to be held by the king, and their revenues to be received by him until appointment to them;
(4) The prelates should be subject to the feudal burdens;
(5) Forfeited goods should not be protected in churches.

(*b*) *The Bill of Rights* (1690) was the enacted form of the 'Declaration of Rights' (1689). It provided that:—

(1) The dispensing and suspending powers of the king should be recognised as illegal;
(2) All royal commissions for erecting ecclesiastical courts are illegal;
(3) Levying money without parliamentary consent and granting fines and forfeitures before conviction are illegal;
(4) Subjects have a right to petition the king;
(5) A standing Army is illegal;
(6) Election of members to Parliament and speech in Parliament is free;
(7) Juries should be properly empanelled and excessive bail not be required;
(8) Parliaments ought to be held frequently.

7. What is meant by 'The Revival of Learning'? Mention some of the greatest men connected with it.

The Revival of Learning in its developed form was the immediate consequence of the full of Constantinople (1451) and the invention of Printing (1474).

By the former, a number of profound scholars, the depositories of classic learning, were dispersed throughout Europe, especially Italy; and by the latter, the means of disseminating knowledge was infinitely increased.

Erasmus and Sir Thomas More, in England; the Florentine, Cosmo de Medici; the Greeks, Bessarion and Lascari; Johann Müller and Reuchlin in Germany; Rabelais and Villon in France, are some of the most noted scholars and patrons of learning during this movement.

8. What events render the following years memorable—1215, 1265, 1360, 1536, 1620, 1704, 1745, 1757, 1776, and 1805?

(*a*) 1215, Signing of Magna Charta.
(*b*) 1265, Origin of popular parliamentary representation. Battle of Evesham.
(*c*) 1360, Treaty of Bretigny between England and France by which Edward III. renounced his claim to the throne of France, but his sovereignty was acknowledged over Calais, Guisnes, Ponthieu, Poitou and Guienne.
(*d*) 1536, Wales was incorporated with England. Pilgrimage of Grace.
(*e*) 1620, Emigration of the Pilgrim Fathers to New England.
(*f*) 1704, Gibraltar captured by Sir George Rooke. Battle of Blenheim.
(*g*) 1745, Rebellion in favour of Young Pretender. Battle of Fontenoy.
(*h*) 1757, Battle of Plassey.
(*i*) 1776, Declaration of American Independence.
(*j*) 1805, Battle of Trafalgar and death of Nelson.

9. At what periods of its history has England been most intimately connected with Spain, Burgundy, and the Netherlands respectively?

N.B.—In answering this question we exclude the contact of war, and only include the most intimate connections of peace, alliance or assistance.

(*a*) *Spain.*—From 1501 to 1558. During this period Catherine of Arragon was married to Arthur Tudor and next to Henry VIII., and Philip of Spain was married to Bloody Mary. From 1808 to 1814, during the continuance of the Peninsular War.

(*b*) *Burgundy.*—From 1415 to 1432 an alliance existed between the Duke of Burgundy and the English, the former assisting the latter in their French campaigns. Throughout the Wars of the Roses, 1455 to 1485 the Burgundian Court assisted the Yorkists.

(*c*) *Netherlands.*—In 1584 Elizabeth assisted the Netherlands against Spain with 6,000 men on condition of receiving in pledge Flushing, Rammekins and Brill. From 1689 to 1713, a period comprising the reigns of William III. and Mary, England and Holland were closely united against the French.

10. Compare the extent of the English dominions in 1360, 1660, and 1760.

In 1360 England possessed, in addition to Wales and Ireland Calais, Guisnes, Ponthieu, Poitou and Guienne.

In 1660 Scotland and England were practically united, and Virginia, Barbadoes, Bermuda, New Brunswick, Nova Scotia, Prince Edward's Island, St. Kitts, Nevis, Bahamas, Turk's Island, Gambia, Antigua, Montserrat, St. Helena and Jamaica, Surat and Madras were ours.

By 1760 we added the Gold Coast Settlements, Senegal, Goree, Virgin Isles, Honduras, Gibraltar, Canada, the eastern portion of the United States, Bengal, and the Carnatic.

11. Sketch the condition of Ireland during the reign either of Elizabeth *or* of George III.

Ireland during the reign of George III. In 1759 began a movement in favour of Catholic Emancipation, Parliamentary Reform, and an increase of the country's political status in general. About 1767 the Whiteboys commenced to agitate by means of outrages; and about ten years later Ireland being denuded of troops through our foreign campaigns its defence had to be entrusted to volunteers. These seized the opportunity in 1782 to declare Ireland independent of the British Parliament. During the next eighteen years Ireland was only bound to Britain by the tie of a common occupant of the two crowns; but its independence was a mere name for the uncontrolled rule of a few great families. In 1791 and 1795 the association of 'United Irishmen' was organized and developed with the object of securing Romanist supremacy and establishing a republic apart from England.

In 1798 an insurrection broke out marked by disgraceful atrocities on both sides, but it was quenched by the decisive battle of Vinegar Hill, and a small French force which landed at Killalla was taken prisoner.

In 1801 by the 'Union Bill' Ireland and Britain were united.

During all this reign the condition of the majority of Irishmen was pitiable in the extreme. They were oppressed by a tyrannical government and weighed down by an alien church; their trade was harassed and plundered, and their agriculture burdened by unsympathetic landlords, nor had they any recognized means of legitimate agitation.

What wonder then that subterranean organizations honeycombed society and racial hatred pervaded the masses?

12. "England had never played so great a part in the history of mankind as in 1759." Explain this statement.

1759 was a year of uncommon success and activity. By sea Admirals Boscawen and Hawke won brilliant victories at Lagos Bay and Quiberan Bay respectively, whilst Admiral Rodney did much damage at Havre. On land we greatly assisted Frederic of Prussia, routed the French out of North America, conciliated Bengal and obtained a secure footing in the Carnatic.

13. What is meant by the Hundred Years' War, the Thirty Years' War, the Seven Years' War, the Peninsular War? Give a brief account of *one* of them.

(*a*) '*The Hundred Years' War*' is a term applied to two series of campaigns, the first for the possession of France, the second for that of the New World.

The first commenced in 1339 and concluded in Henry VI's reign, after more or less of intermission, and the second was ended by the capture of Montreal in 1760.

(*b*) *The Thirty Years' War* or the 'Wars of the Roses' extended from 1455 to 1485, beginning with the battle of St. Albans and ending with Bosworth, 1485.

(*c*) *The Seven Years' War* from 1756 to 1763 was between England and France and resulted chiefly from colonial conflicts, particularly in England and America. In 1756 we lost Minorca (for which Admiral Byng was shot) and in 1757 failed to carry out an expedition against Rochefort, and had to sign the disgraceful Convention of Closter Severn whereby 50,000 men were rendered useless for the remainder of the war.

In 1758 we did better, capturing Senegal and Góree, Cape Breton and Prince Edward Island, and destroyed the forts and harbour of Cherbourg. We experienced some reverses at Ticonderago, Crown Point and St. Malo.

The events of 1759 have been briefly recounted in our last answer.

In 1760 we captured Montreal, and beat the French at Wardewash (India). Belleisle, Dominica and Pondicherry were taken in 1761, and in 1762 Martinico, Grenada, St. Lucia and St. Vincent. This year we had to commence hostilities against Spain, and from it we arrested Havanna and captured two galleons, the Acapulco galleon and the Hermione, the former having 3,000,000 dollars on board, and the latter treasure equal to £1,000,000.

Peace was concluded in February 1763 by the Treaty of Paris which secured England enormous concessions.

(*d*) *The Peninsular War* from 1808 to 1814 was contested in Spain and resulted in the complete defeat of the French by Wellington, and the rescue of the entire Peninsula. The chief battles were Corunna, Talavera, Busaco, Barrosa, Fuentes D'Onore, Albuera, Salamanca, Vittoria and the sieges of Cuidad Rodrigo and Badajos.

14. Mention any Scotchmen who, in the 18th century, were distinguished in—(*a*) Science, (*b*) Literature, or (*c*) Art.

The names of Scotchmen eminent in Science and Literature are legion, but in Art they are much fewer.

(*a*) *Science:* Ged invented stereotyping, and Watt (practically) the steam-engine. Thomas Telford and John Rennie were famous *engineers;* James Hutton and John Playfair, eminent *geologists;* W. Hunter, J. Hunter, and J. Abernethy, *physicians;* Dugald Stewart, T. Reed, and T. Brown, *metaphysicians;* Adam Smith in *political economy;* Ferguson in *astronomy,* and Simson in *mathematics,* were equally noted.

(*b*) *Literature:* Ramsay, Thomson, Beattie, Burns, Scott, Montgomery, Campbell, were *poets;* Burnet, Hume, Robert, son Smollett, were *historians;* Smollett and Scott, *novelists,* and J. Wilson, a *reviewer,* &c.

(*c*) *Art:* A. Wilson was noted for his etchings, Wilkie for his paintings in general, and Nasmyth for his landscapes.

15. Explain the historical allusions in the following passages:—

(*a*) 'And Flodden had been Bannockburn.'

(*b*) 'Clarence is come; false, fleeting, perjured Clarence,
That stabbed me in the field by Tewkesbury.'

(*c*) 'Dan Chaucer, well of English undefiled.'

(*d*) 'Ruin seize thee, ruthless King.'

(*e*) 'Ye towers of Julius, London's lasting shame,
By many a foul and midnight murder fed.'

(*f*) 'Oh for a single hour of that Dundee
Who on that day the word of onset gave.'

(*g*) 'The greatest sailor since our world began.'

(*a*) If the Scots had not foolishly abandoned a favourable position for a disadvantageous one.

(*b*) Just before his murder Clarence relates (Shakespeare's Richard III.) to Brackenbury that Henry VI.'s son, Prince Edward, in vision

'Came wandering by,
A shadow like an angel, with bright hair
Dabbled in blood; and he squeaked out aloud
Clarence is come,' etc.

After the battle of Tewkesbury Clarence is reported to have slain the young prince.

(*c*) The language of Chaucer was (rather incorrectly) thought to contain a greater proportion than usual of English (Saxon) words. Chaucer's poems did much to stamp as orthodox the words which he employed.

(*d*) Edward I. is fabled ruthlessly to have slain the Welsh Bards on the shores of Carnarvon, opposite Anglesey.

(*e*) The Tower of London was absurdly reported to have been commenced by Julius Cæsar. Many executions and judicial murders were therein perpetrated.

(*f*) Viscount Dundee (Graham of Claverhouse) commanded the Highland Jacobites when they fiercely and victoriously defeated the Williamites at the Pass of Killiecrankie. There he was killed.

(*g*) Nelson.

16. Name any famous English books which have materially influenced the course of English politics and history.

Wiclif's Bible and various other pre-reformation versions, the Prayer Book, Latimer's Sermons, &c., Leighton's 'Zion's Plea against Prelacy,' Milton's 'Areopogitica,' De Foe's 'Shortest Way with the Dissenters,' Swift's 'Drapier's Letters,' Adam Smith's 'Wealth of Nations,' Sir Philip Francis (?) 'Letters of Junius.'

Owing now to the wide circulation of newspapers, speeches have more political influence than pamphlets or formal compilations.

FIRST YEAR.

Male and Female Candidates.

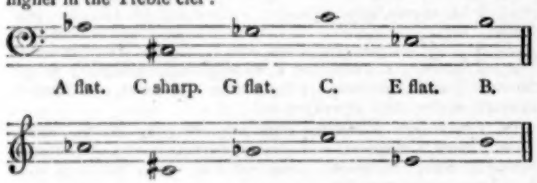
Music.

TWO *hours allowed for this Paper.*

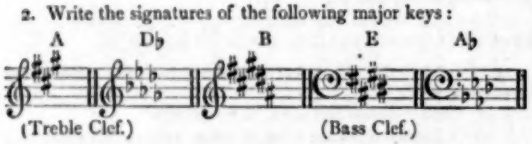
Candidates may answer the questions in either the Staff Notation or the Tonic Sol-fa, but *not both*. The questions in the Tonic Sol-fa Notation will be found at the end. You are not permitted to answer more than NINE questions.

STAFF NOTATION.

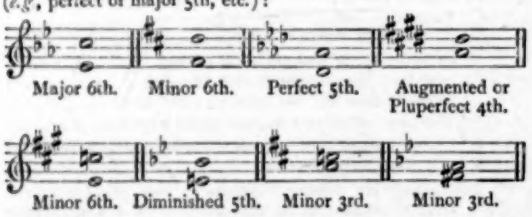
1. Write below each of the following notes its alphabetical pitch name (as C, A, F, etc.), and re-write the notes one octave higher in the Treble clef:



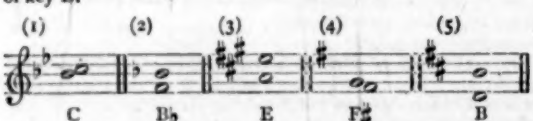
2. Write the signatures of the following major keys:



3. Write under each of the following intervals its name (*e.g.*, perfect or major 5th, etc.):

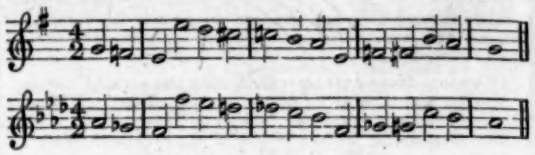


4. Write—(1) The supertonic of key B♭. (2) The subdominant of key F. (3) The dominant of key A. (4) The leading note of key G. (5) The submediant or superdominant of key D.

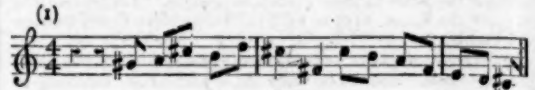


(*N.B.—The tepic was given in each case.*)

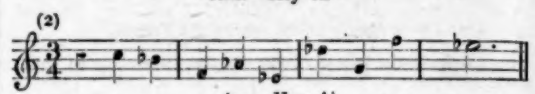
5. Transpose the following a minor second higher, namely, into the key of A♭.



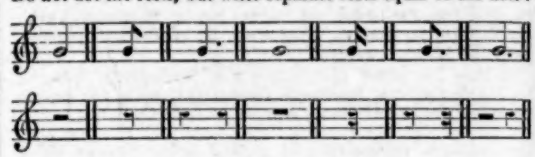
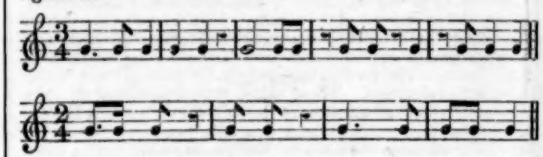
6. In what major keys are the following passages?

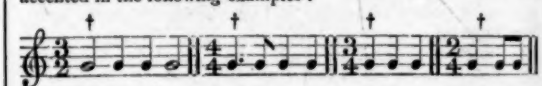
(1)

Ans.—Key A.

(2)



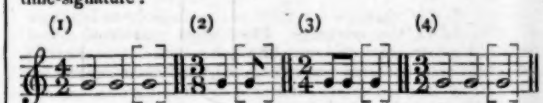
Ans.—Key A♭.

7. Write rests equal in value to each of the following notes. Do not dot the rests, but write separate rests equal to the dots:

8. Bar the following passages in accordance with the time-signatures:

9. Place a mark (†) over the notes that should be strongly accented in the following examples:

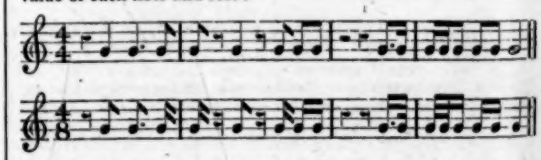


10. Add one note at the end of each of the following examples to complete the bar or measure in accordance with the time-signature:

(1) (2) (3) (4)



11. Transcribe the following from $\frac{4}{4}$ into $\frac{4}{8}$ time, halving the value of each note and rest:

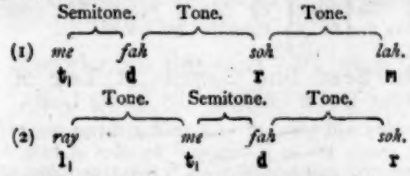


12. State the meanings of the following terms, and give the words that express the opposite meanings:

	Meanings.	*Opposites.*
(1) Diminuendo.	Gradually softer.	*Crescendo.*
(2) Piano.	Soft.	*Forte.*
(3) Staccato.	With the notes cut short.	*Legato.*
(4) Accelerando.	Gradually quicker.	*Rallentando.*

TONIC SOL-FA NOTATION.

1. What other four contiguous tones of the scale are separated by the same steps or intervals as (1) *me, fah, soh, lah*, and (2) *ray, me, fah, soh*?



2. Which are the leaning or expectant tones of the scale, and which are the strong tones or tones of repose?

(1) Expectant tones:—*te, fah*, and in a lesser degree *ray* and *lah*.
(2) Strong tones:—*doh, soh*, and *me*.

3. What circumstances tend to modify the mental effects of scale tones?

(1) Speed. (2) Force. (3) Pitch. (4) Harmony. (5) Rhythm. (6) Mode. (7) Accent. (8) Position in the chord, (*e.g.*, highest or lowest tone, &c.)

4. Name (as major third, etc.) the following intervals:

(1)	r t	Major 6th.	(5)	m d'	Minor 6th.
(2)	t1 s	Minor 6th.	(6)	t1 f	Imperfect 5th.
(3)	r l	Perfect 5th.	(7)	r f	Minor 3rd.
(4)	f t	Pluperfect 5th.	(8)	fe l	Minor 3rd.

5. Re-arrange the following notes in order of pitch, placing the lowest note first in each case:

(1)	s	d'	m	r'	t1	fe	d	s1	ta	l1	r
	s1	l1	t1	d	r	m	fe	s	ta	d'	r'
(2)	ta1	m	r'	f	t1	fe	l	d	m'	s	l1
	l1	ta1	t1	d	m	f	fe	s	l	r'	m'

6. Which of the following notes is highest in pitch and which lowest?

(1) t_1 in Key C.
(2) l_1 in Key B♭.
(3) m_1 in Key A♭.
(4) r' in Key D.
(5) f in Key B.

Highest.—f in Key B.
Lowest.—t_1 in Key C.

7. State the major scale relation (as sub-dominant, etc.) of the following tones:

(1) s = Dominant.
(2) d' = Tonic.
(3) f = Sub-dominant.
(4) r = Supertonic.
(5) t = Leading-note (or Sub-tonic).

8. Fill up two measures of each of the following kinds, showing rests and continuations in each example. (1) Two-pulse measure. (2) Four-pulse measure. (3) Three-pulse measure.

(1) | d :- .d | d .,d : d . ‖

(2) | :d .d | d :— | -.d : d .,d | d . : .d ‖

(3) | .m :f .m .r : s .,m | d' :- .m .,s : d . ‖

9. Write in figures over the following the value (as 1 pulse, ½ pulse, 1 and ¼, etc.) of each note and rest:

2½ ½ ¾ ¼ 1½ ½ ½ (½ ½) ½ ¼ ¼ ½ ½ ½ 1 1

| s :— | -.f : m .,f | s :- .l | r . : .m | f,s .l : s .d | r :d ‖

10. Write the time names (as *taa*, or *taa-tai*, etc.) of the following pulses:

(1)	|1 .,1 :1 ‖	TAA fe	: TAA
(2)	|1 :1 .1 ‖	TAA .	: TAA-TAI
(3)	| :1 ‖	*SAA*	: TAA
(4)	|1 :- .1 ‖	TAA-	: AA TAI
(5)	|1,1 .1 :1 .1 ,1 ‖	tafa TAI	: TAA tefe

11. Re-write the following in four-pulse measure, doubling the value of each note and rest:

(1) | s .f :m .d | (2) | r :- .m | (3) | f,s .l ,t : d' .s |

(4) | m . : .f | (5) | m ,r . d :r .d | (6) | d :— ‖

(1) | s :- .f | m :d | (2) | r :— | — :m | (3) | f .s : l .t | d' :s |

(4) | m : | :f | (5) | m .r : d | r :- .d | (6) | d :— | — :— ‖

12. State the meanings of the following terms, and give the words that express the opposite meanings:

	Meanings.	*Opposites.*
(1) Diminuendo.	Gradually softer.	*Crescendo.*
(2) Piano.	Soft.	*Forte.*
(3) Staccato.	With the notes cut short.	*Legato.*
(4) Accelerando.	Gradually quicker.	*Rallentando.*

(To be continued.)

—o—

Publications Reviewed.

PRIZE BOOKS.

Messrs. Blackie and Son's List.

(1) A Rough Shaking. By George Macdonald.

A wonderful conception. Gentle Clare Skymer wins the heart of the reader, as he wins the affection of all living things with whom he comes in contact. Everything helpless or in need of a friend seems to turn to him. A child of trouble and sorrow himself, his heart seems to comprehend all dumb sorrow. Clare believes that animals will be in existence in the next life, and that he will one day see his earthly pets and loves again.

The tendency of the book is to teach kindness and gentleness, and the tone is elevating throughout.

The scene of the earthquake and the tiny boy watching over his dead mother, is exceedingly touching.

A word must be said about the twelve pictures by W. Parkinson. They are exquisite, and add a great charm to this heart-improving book.

(2) Nut Brown Roger and I. By J. H. Yoxall.

This bewitching 'romance of the highway' will surely be a favourite. The highwayman is an honest one, and assumes his disguise in the interests of justice and right. This being the case, the tale is entirely free from all objectionable qualities which are so often rife in books of this kind. The descriptions of country scenes, sounds, and folk are artistic and life-like.

The village doctor of olden days, with his fat pony 'Paregoric,' is quite a study.

We give this delightful volume our highest praise.

(3) Cross Purposes, and The Shadows. By George Macdonald.

(4) Lily and Rose in One. By C. S. Lowndes.

(5) Patty's Ideas. By L. E. Tiddeman.

(6) Tom in a Tangle. By T. Sparrow.

(7) **Daphne.** By E. O'Byrne.

(8) **Crowded Out.** By M. B. Manwell.

These attractive little volumes are beautifully bound and well written.

The same may also be said of the following beautiful booklets :—

(9) **The Royal Eagle.** By Louisa Thompson.

(10) **From over the Sea.** By L. E. Tiddeman.

(11) **The Kitchen Cat.** By Amy Walton.

(12) **Two Little Mice.** By Mrs. A. H. Garlick.

This is a delightful nursery story for the very little ones.

(13) **A Change for the Worse.** By M. Harriet M. Capes.

A clever fairy story, full of good moral teaching.

(14) **Our Two Starlings.** By Christian Redford.

A pretty story of home life and love.

(15) **The Youngest Princess.** By Jenny Chappell.

The tale shows how even a little girl can bring about much good, by doing lovingly and well little kindnesses, and thus become a true Princess.

(16) **Arthur's Temptation.** By Emma Leslie.

A capital book to give a young lad, full of sound advice. In it he is taught never to try to persuade himself that wrong doing can bring success, and is especially warned against betting.

(17) **Philp Danford.** By Julia Goddard.

A school story, well written and helpful for young people.

(18) **Freda's Folly.** By H. S. Haycraft.

A story likely to induce young people to think seriously of their start in life. A brother and sister both have to suffer much through making a false start, and not being true to conscience.

(19) **Maori and Settler: A Story of the New Zealand War.** By G. A. Henty.

This delightful and instructive book gives the history of a family going out to New Zealand during the war in that country. True to his colours, Mr. Henty accords the place of honour to the young people in the story. Wilfrid and Marion Renshaw, a sensible and sturdy English boy and girl, by their cheerfulness and courage, help their parents to face loss of money and position, and to make a fresh start in life in New Zealand. Their adventures on the voyage and in the new Settlement are exciting and thrilling. Finally they are rewarded by having a successful farm and a prosperous business. A map is given of the particular district where the chief incidents in the story take place. Mr. Henty tells us in the preface that the main features of the story are strictly in accordance with facts, a trait which makes all the historical tales of this delightful author invaluable to young folks.

Mr. Alfred Pearse's illustrations are admirable. The book is a handsome one to look at.

(20) **By England's Aid; or, Freeing of the Netherlands.** By G. A. Henty.

The very title of this handsome book will delight the ears of English young folk. Though full of historical facts, the story is so entrancing that there is not a dry page from back to back.

Geoffrey and Lionel Vickars, two lads, sons of a clergyman, manage, to their delight, to be appointed pages to one of the Vere's of history, and thus take part in the rout of the Spanish Armada and various battles and sieges of that stirring period. There is an atmosphere of old world romance about the wooing and the winning of the two Spanish maidens, and the story demonstrates the fact that Spaniards can have hearts as good and true as our own kith and kin. There are four maps in the book, and the illustrations by Alfred Pearse are excellent. Altogether one of Mr. Henty's best books.

(21) **The Seed She Sowed: A Tale of the Great Dock Strike.** By Emma Leslie.

This story will give all who read it a true view of the working man's life at home, and an idea of how things are talked over and looked at from the standpoint of the workman's own fireside. It tells how much self-denial and hardship the striker often experiences for the sake of the common good. A gentle Christian girl is the heroine, and she reaps a reward of kindness and love, the fruits, her friends all say, of the seed she sowed.

(22) **Hussein the Hostage; or, a Boy's Adventures in Persia.** By G. Norway.

A first class story, teeming with interesting details of life in the East. Original and thrilling adventures come to Hussein, the young Persian Prince, who is sent as an hostage to a rival tribe. The book is elegantly got up, and will make a handsome present for any boy or girl. The eight full-page illustrations by John Schönberg are excellent and to the point.

(23) **Unlucky.** By Caroline Austin.

This pathetic little history of girl life is a story of to-day. The children and parents are just what one expects them to be in real life. Miss Austin, with a delicate touch, reveals the weakness as well as the good in each of her characters. Thus the reader can see where all the mistakes and regrets of a lifetime could have been avoided. A sacrifice of feeling, or a curb in the tongue would often turn the whole course of another's life. Though the finish of the story is sad, 'Unlucky' is a good book for a girl.

(24) **A Rash Promise; or, Meg's Secret.** By Cecilia Selby Lowndes.

A pretty life-like story, suitable for either boys or girls. Poor, true-hearted little Meg's troubles may well teach little folks how careful they should be when they make a promise. Also, how much unhappiness may arise by keeping back the whole truth. The children are life-like. The good ones are not perfect, and the others not all bad. The style is bright and entertaining.

(25) **The Secret of the Old House.** By Evelyn Everett Green.

'The Old House,' supposed to be haunted, becomes the favourite playground of two children. One day, overtaken by a storm, they make friends with the caretaker, and getting permission to roam at will over the house, they ultimately discover the ghost to be none other than an invalid boy, who shrinks from company of every kind. They succeed, much to the delight of his nurse and joy of his grandfather, in getting him to join in their games, and in winning him back to health and happiness. The story is capitally told.

(26) **A Chapter of Adventures.** By G. A. Henty.

A bright natural story of a lad from one of our small fishing villages. By a series of accidents he is left in Alexandria during the bombardment. Often in great peril and suffering, he shows true English pluck, and comes out of all his adventures on the right side. The characters are so lifelike that the book is sure to become a favourite. The type is exceptionally clear and the pictures good.

(27) **The Light Princess and other Fairy Stories.** By George MacDonald.

This is another enchanting echo from fairyland. The charm of the book is such, that we long for it to be read to all the children we know, just for the pleasure of seeing their eyes sparkle with delight.

(28) **Everybody's Business.** By Ismay Thorn.

The dark side of child life in a big city is touchingly portrayed in this story. Many are the troubles which overtake poor Lois and her friend Seth. One cloud, however, has a silver lining; Lois is hurt, and the doctor called to attend her proves to be a friend indeed. Altogether a charming gift book.

(29) **By Right of Conquest, or; with Cortez in Mexico.** By G. A. Henty.

Another historical tale of first rate quality. The hero is thrown from the wreck of his father's ship upon the then unknown coast of the western seas. Kindly treated by the natives he soon learns their language, becomes a favourite, and eventually, though disinclined, joins the Spaniards in their Conquest of Mexico. His curious experiences, amongst which are the finding a treasure hoard and marrying a native princess, make up a charming story. The two maps enhance the historical value of the tale, and ten beautiful illustrations, by W. S. Stacey, adorn it.

(30) **'Twixt School and College: A Tale of Self-reliance.** By Gordon Stables.

A true story, full of delightful scenes in Scotch country life. Fred Hallam leaves school to help his father on their farm. Pleased with the lad's industry, and knowing his love of books, the farmer gives him a tiny cottage and bit of land for his own, so that he can have a study after his own heart. By working late and early Fred soon has a fine garden and no end of pets, for the love of animals is one of his strong points. He applies himself diligently to his studies, and in due course is qualified to take pupils. This, with the sale of produce and stock, enable him to make money. By unflagging perseverance he attains the desire of his life, takes a degree with honours, and enters the church. A splendid example of industry, uprightness and last, but not least, gentleness.

The artistic binding of the book, together with W. Parkinson's eight beautiful pictures, combine to make it one of the handsomest prize books of the season.

Messrs, Cassell and Co's List.

(1) **Vol. Work, 1890.** Edited by Francis Young.

This handsome volume must indeed prove a boon to the handicraftsman into whose hands it comes. It contains the fullest information about all kinds of work, from making a suite of furniture to cleaning a watch. Valuable illustrations and diagrams adorn almost every page. Every school library and every household should possess a volume of Work. To the young workman it will indeed be priceless.

T. Fisher Unwin's List.

(1) **Alexis and his Flowers: Flower lore for Boy and Girls.** By Beatrix F. Cresswell.

Alexis, by the aid of good fairies, holds converse with his favourite flowers. They tell him much of their history, and many beautiful legends of flower land. Instructive and entertaining, this elegant little volume is admirably fitted for a prize book. The pictures of flowers, drawn by Henrietta Cresswell, which embellish each chapter, are very dainty.

Hodder and Stoughton's List.

(1) **Hermie's Rosebuds, and other stories.** By L. T. Meade.

Fresh natural stories of everyday life make up the main part of this beautiful book. The story of 'How Nora Crena saved her own,' is quite dramatic. Emphatically a good book for a present.

(2) **A Little Silver Trumpet.** By L. T. Meade.

'The Little Silver Trumpet' should proclaim the praise of the author. Full of good teaching and sweet thoughts is this bright bonny story. It is illustrated by T. Pym with just the pictures children like.

The National Society's List.

(1) **Peckover's Mill.** By the author of 'Starwood Hall,' &c. With five full-page Illustrations.

This is a story of a Jacobite conspiracy which was started in the winter of 1739. Silas Peckover returned to his native country and took possession of the ancestral home. Mistress Ruth helps to rouse Silas to a sense of duty and honour by her true womanliness and honesty. 'Peckover's Mill' will give plenty of enjoyment to boys and girls who delight in stirring incidents. The book is beautifully printed and bound. The illustrations strike us as a little unworthy of the paper, printing, and covers.

(2) **The Green Girls of Greythorpe.** By R. Coleridge, author of 'Maud, Florence, Nellie,' &c.

Here is a charming story for girls. The Green School at Greythorpe is an old endowed foundation that has come under the notice of the Charity Commissioners, who decide that a re-organisation and extension of the school is necessary. The system of education pursued at the school, in their opinion, needs to be brought up to modern requirements. Pending the alterations, the girls are taken to a quiet spot in Cumberland for a holiday, and Miss Coleridge's story is largely taken up with the adventures that befall them on the mountains near Screeside. The picture upon the lid of the book is exceedingly pretty; the rest are second rate. The book as a whole is excellent.

(3) **The Slaves of Sabinus.** By Charlotte M. Yonge, author of 'The Heir of Redclyffe.'

This new story by a deservedly popular author will be read with much pleasure. It is a powerful story of the Christian church in the days when Vespasian was Roman emperor and his more genial son was freshly returned from his conquest of the Jews. The contrasted characters are Esdras the Jew, and Telamon the Gentile. Both in the end become Christians, and bring about the conversion of their master. We need say nothing to recommend a story by Miss Yonge beyond remarking that the story and its treatment is worthy to be classed with her former efforts.

(4) **The Locked Desk.** By Frances Mary Peard, author of 'The Blue Dragon,' &c.

Miss Peard has formerly given us historical tales. The one before us is a tale of the present day. The documents in Mr. Barton's desk play an important part. There is plenty of incident, and the characters are well drawn and show a good deal of accurate observation and insight into child nature.

(5) **Dangerous Jewels.** By M. Bramston, author of 'A Pair of Cousins.'

This story is laid in Brittany at the time of the great French Revolution. The children of the Baron de Kergoët are sent to England to be out of danger, but on

their road thither they are kidnapped by gipsies for the sake of the family jewels which they were carrying with them. Some scenes are laid in Devonshire, and the story contains vivid descriptions of rough life in a lonely hut on the moorlands of Devonshire.

(6) **The Family Coach.** By M. and C. Lee, authors of 'Dimsdale's Grandchildren.'

Here we have a story of a family of children, their schemes and plans, and the misfortunes which consequently ensue in the course of a journey from London to Mentone, where they are to meet their parents who have just returned from India. Considerable amusement and quite humour will be found in the description of the arrangements which the children make for conveying their various pet animals with them, but more particularly in the chapter which tells how Miss Trapp refuses to travel with a menagerie.

The last four books, like the first four, are admirably printed and bound. The covers are in every case neat and attractive. We did not commend the illustrations of the first books, nor can we praise those in the others. A few years ago they would have been thought really good. But in scarcely anything has the advance been greater than in book illustration. One has only to open the volumes now supplied to Elementary Schools to see how beautifully, how really artistically illustrations can now be produced at a comparatively small expense. The National Society are to be congratulated upon the excellence in taste, tone and execution generally of their prize books, and we wish their books may have a very wide circulation.

(7) **A Little Candle.** By Mary H. Debenham, author of 'Fairmeadow's Farm,' &c.

This new story of Miss Debenham is concerned with Scotland in the stormy days of Claverhouse. The little candle is Bride Galbraith, the grand daughter of Murray. How the clergyman is forcibly turned out of doors and his home ransacked, and how by her tenderness and grace Bride Galbraith comforts and softens the afflictions through which the whole family have to pass, the readers must find out by perusing the story for themselves. It is a healthy interest that the narrative excites, and full of instruction. We strongly recommend the book. Like the other Xmas prizes of the National Society we are noticing, it is most tastefully bound.

(8) **The Vicar's Trio.** By Esmè Stuart, author of 'Last Ashore.'

This is a story of Lord Faulconbridge, a peevish and irritable boy, who is brought to see that rank and wealth bring their duties and responsibilities, as well as their pleasures. The Vicar's Trio, Mattie, Lucy, and Bernard, though quite unconsciously, are the means of bringing about this happy change. The occasion is the efforts made to promote the interests of the Church Extension Fund. The story will be attractive to very many, though of course the subject is of limited interest. The publishers have left nothing to desire in printing and binding the book. The illustrations are of the average quality.

Royal School Series: Standard-Authors Readers, I., II., III. London: T. Nelson & Sons.

We are glad to give a hearty welcome to this latest of the many well-planned series of reading books published by the Messrs. Nelson. We are not sure that perfect novelty can be claimed either for the title or for the fundamental idea of the Standard-Authors Readers. But the idea and the manner in which it has been carried out in these first three volumes seem alike deserving of the highest commendation. We say this the more willingly because we have somewhere seen some depreciatory comments in a notice anticipating the appearance of these books, based apparently on a fear that they would embody an attempt to summarise or 'boil down' the works of eminent writers to adapt them for school-children. The books themselves are, in our opinion, far from justifying such a fear. They consist, indeed, of selections from such standard works as most readily appeal to young minds. Well-written chapters of biography are prefixed to the selection from each writer, with the addition, in most cases, of extracts expressing the opinions of critics and others on the author illustrated. There is evidence of a careful endeavour to give some unity to each selection, and also to make it representative. To give a clearer notion of the series we will briefly describe the contents of the second volume, which is devoted to Dickens, Longfellow, and Coleridge. We have first, with regard to Dickens, the 'Story of his Life' in three lessons, then two lessons consisting of 'Opinions on Charles Dickens,' selected from Carlyle, Jowett, Bishop of Manchester, A. Lang, Dean Stanley, and others. Next comes Bret Harte's touching poem, 'Dickens in Camp.' The selections from Dickens include five short pieces from the 'Old Curiosity Shop,' two from the 'Pickwick Papers,' and others from 'Martin Chuzzlewit,' 'A Christmas Carol,' and 'Barnaby Rudge,' with an additional lesson consisting of short extracts. Longfellow is introduced in seven short chapters of biography, a couple of pages of opinions, twenty-six of his favourite short poems, 'Paul Revere's Ride,' and five lessons from 'Hiawatha.' Coleridge is illustrated by a sketch of his life, and 'The Rime of the Ancient Mariner.'

Where it seems desirable, introductory paragraphs are given to throw light on the meaning of the poem or the connection of the story. We consider such books as these likely to secure a two-fold advantage. They will train children to appreciate good literature, and so give them a desire to make further acquaintance with the works and authors thus introduced to them.

Full-page portraits and other suitable illustrations embellish the volumes. Lists of words for spelling are absent, but the more difficult words and allusions are explained.

The first volume includes selections from Captain Marryat, Mrs. Hemans, and Southey, and the third is occupied with similar treatment of Defoe, Mackay, and Campbell. The series, it is announced, will consist of six volumes suitable for Standards IV. to VII., and for general use in Middle Class Schools.

Studies in Elocution. By T. Harrower, F.S.Sc. (Lond.). London: T. Nelson & Sons.

The introduction to this volume gives in brief form some sensible advice on Breathing, Voice Production, Pronunciation, and Modulation as essential elements in good reading. The bulk of the book consists of a good selection of pieces suitable for practice in reading and recitation. These are divided into sections under the headings, 'Selections in Prose,' 'Selections in Poetry,' 'Dialogues and Scenes' from Plays and Novels, and 'Sacred Readings.' The first two prose passages are marked for pauses, and the whole of the sacred readings are carefully marked for inflection. The rest of the pieces are without any special marks or notes for the guidance of the student. Several of the poems are printed in prose form instead of being divided into rhythmical lines. The prose selections might, we think, have included more passages from rhetorical writers of the highest class. It seems rather startling to find in the reading, 'Caleb Plummer and his Blind Daughter,' adapted from 'the Cricket on the Hearth,' Mr. W. S. Gilbert's song, 'The Great Oak Tree' from *Ruddigore*.

The volume is very well printed, and neatly and serviceably bound.

The Royal Story-Book Readers: (1) Stories from Fenimore Cooper's Tales. (2) Ivanhoe. London: T. Nelson and Sons.

We are greatly pleased with these two books for Standards V. and VI. They worthily follow those we reviewed last month. It is almost a work of supererogation to speak of the get-up of the volumes. As for their contents, they display the care and intimate acquaintance with the necessity of schools and the tastes of children which characterise most of the Royal Series.

Standard V. contains a pleasantly written sketch of Cooper's life, and then capital selections from the novels which we consumed with great avidity in our younger days—*The Deerslayer*, *The Pathfinder*, *The Last of the Mohicans*, *The Pioneers*, and others.

Standard VI. is a capital specimen of what such a book should be, and if all our great authors were treated in the same way much would be done to counteract the tendency to read the worse than worthless literature which many of our boys choose to read. There is a capital introduction to *Ivanhoe* in the shape of some historical lessons on Saxon and Norman England, the Feudal System, Robin Hood, Richard the First and the Crusades; then a Life of Sir Walter Scott, Jeffrey's 'Review of Ivanhoe,' and a brief sketch of the tale. Afterwards come upwards of thirty selections from the novel itself. Each volume contains a good, useful, and large selection of suitable poetry, and the grammar required by the Standard according to the Code.

Both books can be very strongly recommended.

Questions for Examination in English Literature, with an introduction on the study of English. By the Rev. Walter W. Skeat, Litt. D., LL.D. London: George Bell & Sons.

The object of this book is to help forward the important modern movement in favour of the systematic study of English. The introduction gives much valuable aid in this direction in the form of definite advice as to the method of study and suggestions as to the selection of books for study. The examination questions consist of nearly eighty papers actually set, most of them at Colleges in the University of Cambridge, and a large proportion of them by Dr. Skeat himself. They cover a wide range from Anglo-Saxon and Early English, and Chaucer to Tennyson. Used in the way suggested by the learned compiler, they are likely to prove extremely useful to students, and fruitful of suggestions to the teacher and examiner.

The Comprehensive Examiner. By David Clark. London: Blackie and Son.

On the title-page this book is described as 'A Handbook for Teachers and Students, being a full Series of Questions on the principal subjects prescribed in the Code.'

To this description the contents very satisfactorily correspond. In the course of some 320 pages we have a copious assortment of questions on English Grammar, Geography, History, Arithmetic, on Algebra, Mechanics, Physiology, Magnetism and Electricity, and Domestic Economy. The questions on the class-subjects of the Code are arranged in sets so as to cover the whole course prescribed. In Arithmetic and the specific subjects, the questions given constitute a set of twenty-five tests, similar to those of a Government inspector, for each Standard (Second to Seventh), or each stage (First, Second and Third), into which the subject is divided. In various appendices we find tables for Parsing and Analysis, sets of sentences for practice, and lists of subjects for composition exercises. Answers to the Tests in Arithmetic, Algebra and Mechanics are printed at the end of the book. The whole collection is one which would prove very useful to teachers, by affording an abundant supply of such tests as must be applied in preparing classes for the Government examinations.

Excelsior Astronomical Diagrams. London: G. W. Bacon and Co.

These carefully designed diagrams, six in number, have much to recommend them. Being bold and clear in treatment the details are conspicuously brought out, and the charts are consequently well adapted for class-teaching. Happy advantage has been taken of the resources of modern colour printing, and the result is a set of wall sheets which it would be difficult to surpass in price, workmanship, or educational value. It may be added that the six charts illustrate respectively, 'Latitude and Longitude,' 'Day and Night,' 'The Seasons,' 'The Phases of the Moon,' 'The Solar System,' and 'The Tides.'

Excelsior Fraction Diagrams. By F. J. Knight. London: G. W. Bacon and Co.

This is a series of five sheets, printed in colours, and designed to afford an attractive and intelligible means of drilling a class in Fractions. Mr. Knight has, we think, been signally successful in elaborating a graphic demonstration, not only of the meaning of the various kinds of fractions, both vulgar and decimal, but also of the processes employed in adding, subtracting, and otherwise manipulating them. It may safely be affirmed that if, after studying these sheets, a pupil fails to understand why $\frac{6}{12}=\frac{1}{2}$, or how $\frac{1}{12}$ can be added to $\frac{1}{2}$, the failure to comprehend can only be ascribed to innate density on his part. The series has our warm commendation.

Heat and Light Problems. By R. W. Wallace, B.Sc. London and Cambridge: W. B. Clive & Co.

This is a small book of about 100 pages, issued as a supplement to the elementary text book of Heat and Light, noticed by us in our last month's issue. It consists of a collection of questions upon the subjects discussed in that book, together with a fair number of examples fully worked out.

French Prose Readers. By Barlet and Masom. London and Cambridge: W. B. Clive & Co.

This consists of one hundred extracts, selected and arranged for practice in reading French at sight. As an Advanced French Reader by the same authors is already published, we take it that these extracts are intended for those who are specially preparing themselves for the Matriculation Examination at the University of London. It is a collection of passages, only without notes and without vocabulary.

Advanced French Prose Readers. By Barlet and Masom. London and Cambridge: W. B. Clive & Co.

This is a book of more advanced reading and also containing passages of verse; the book being about equally divided between poetry and prose. There is no preference, but we should expect that the student is to proceed with the poetry and prose simultaneously. Like the companion volume it contains neither notes nor vocabulary.

Notes on Shakespeare's Play of King John. By T. Duff Barnett, B.A. (Lond.). London: George Bell and Sons.

Another of the well-planned series of Mr. Barnett's Notes on Shakespeare's Plays, printed without the text. The introduction contains some judicious comments on the nature and meaning of the play, and compares certain scenes and characters with others in other plays of Shakespeare. There is also a carefully drawn distinction between Tragedy and Historical Drama. As in previous numbers of the series, the information of all sorts is ample, and is very conveniently arranged.

History of English Literature: 1485—1580 A.D. By W. H. Low, M.A. (Lond.). London: W. B. Clive & Co.

This volume is one of the Tutorial Series published in connection with the University Correspondence College. It contains a very complete and careful summary of the facts respecting the authors who lived and wrote in the century immediately succeeding the close of the Wars of the Roses. Students who are preparing for the London Intermediate Arts Examination next year, are required to make themselves acquainted with English History and the History of English Literature during this period. To be fully prepared, a candidate should have some direct knowledge of the Literature by reading some of the most important works. In an introductory note, Mr. Low gives a list of those it is most advisable to read. By means of a clearly written narrative, careful analysis of the principal works, and critical comments on the writers, the author has treated his subject so thoroughly, that the student who masters this little book, and reads the selections recommended, is pretty sure to find himself amply equipped for this part of the examination.

Philips' Standard Atlas. Nos. 1—4. London: George Philip & Son.

Published in four octavo books, varying in price from twopence to fourpence, and suited respectively to Standards III.—VI., this Atlas comprises all the maps necessary both for actual map drawing and for acquiring a general geographical acquaintance with the earth. Many of the maps are clear both in colour and outline, and as a rule are not too crowded with names. The sectional maps are well drawn and will serve admirably for a more extended knowledge of the parts they represent. In all but the continents, we much prefer the lines of latitude being drawn straight for school purposes.

A History of England, 1485—1580. By C. J. Farrenside, M.A., B.Sc., and W. H. Lowe, M.A. London and Cambridge: W. B. Clive & Co.

This is a very useful text book for the Tudor period of English History. It is clearly and concisely written and it contains all that is really necessary for an intelligent appreciation of this most interesting and important period. There are tables of genealogies and chapters on the literature and leading biographies. There are no maps.

MESSRS. JOSEPH HUGHES & Co. have in the press, and will shortly publish, an **Elementary Physical and Astronomical Geography**, by R. A. Gregory. *The Science Schools, South Kensington; Fellow of the Royal Astronomical Society;* Correspondent of the '*Revue Générale des Sciences.*' This work has been designed to cover the whole of the Physical Geography required by Pupil Teachers, and for the Scholarship and Certificate Examinations. In its construction the author has borne in mind the fact that Pupil Teachers as a rule do not have sufficient time to extend very much their knowledge of even the most interesting of all the sciences. He has, therefore, treated the subject in a comprehensive manner and conveyed the information in simple language. One of the most commendable features is the number of original and well chosen illustrations, included not for pictorial effect but to demonstrate the facts contained in the text. At the end of each chapter a general summary is given of the matter it contains; this summary will not only serve to call to the student's mind that which he reads in a more extended manner in the various chapters, but is intended to be a sort of guide as to the manner in which examination questions should be answered. Although the Physiography Syllabus of the Science and Art Department has a somewhat wider and different range than that for which this work is intended, there is no doubt that the student who reads and understands the subject as it is here treated is sure to obtain an elementary, if not an advanced, certificate at the May Examinations.

LONG-TOTS COMPULSORY.

DR. BEACH'S ARE THE BEST. PRICE ONE SHILLING.

The *TEACHERS' AID* says:—'They stand first in the market.'

DR. BEACH'S CARDS.

PRICE ONE SHILLING PER PACKET.

The Series consists of Packets for Standards II. to VII. inclusive, and a Packet of '**Long Tots.**'

Standards II., III. and IV. contain Forty Cards each; V., VI. and VII., Thirty-two Cards each; and the 'Long Tots' Forty Cards.

The first two packets provide on each card both 'Daily Working Exercises' and an 'Examination Test,' and in the next four packets there is a further Test especially suited to Girls. There are thus **590** separate groups of Exercises.

Two copies of the Answers are enclosed in each packet.

The Schoolmaster says:—'The series is one that can be strongly recommended to the practical teacher.'

The Educational Times says:—'They will be an immense relief to the teacher.'

The Teachers' Aid says:—'**We have thoroughly tested this set, and find them to be the most methodical, and calculated to develop intelligence and intelligent methods of arithmetical solutions. They almost obviate the usage of anything else throughout the year.**'

☞ *By working on the plan of these Cards, nearly cent. per cent. has been obtained for sixteen years.*

LONDON:

JOSEPH HUGHES & CO.,

PILGRIM STREET, LUDGATE HILL, E.C.

300090

GEORGE PHILIP & SON'S LIST.

THE GEODOSCOPE.

Invented and Patented by A. M. GREGORY.

This Handsome and Novel Apparatus is the result of long experience of the practical difficulties which arise in teaching the elementary principles of Astronomical Geography.

Its Primary design is to exhibit in an attractive and impressive form the true relation of our earth to the celestial sphere and the intervening atmosphere. The phenomena connected with the seasons, day and night, etc., can also be illustrated simply and accurately.

Price Complete, with Descriptive Handbook, £2 2s. nett.

The Handbook (12 pp.) will be forwarded post free for 1½d.

COMMERCIAL EDUCATION.

Two New Volumes by J. YEATS, LL.D., F.S.S., F.G.S.
Just Published.

1. **THE GOLDEN GATES OF TRADE, with our Home** Industries, introductory to A Study of Mercantile Economy and of the Science of Commerce. Crown 8vo, with map, price 4s. 6d.
2. **MAP STUDIES OF THE MERCANTILE WORLD.** Auxiliary to our Foreign and Colonial Trade, and illustrative of part of the Science of Commerce. Crown 8vo, price 4s. 6d.

APPLIED GEOGRAPHY. A Preliminary Sketch by J. SCOTT KELTIE, Librarian of the Royal Geographical Society. With numerous coloured maps and diagrams. Crown 8vo. [*Nearly Ready.*

GEORGE PHILIP & SON,

LONDON: 32, FLEET STREET.

LIVERPOOL: 45—51, SOUTH CASTLE STREET.

CITY OF LONDON DAY TRAINING COLLEGE,

WHITE STREET, MOORFIELDS, E.C.

(Two minutes' walk from Moorgate Street Station, 5 from Broad Street, Liverpool Street, and the Bank.)

CERTIFICATE, 1890.

3rd Quarter begins Saturday 5th July.

SCHOLARSHIP, 1891.

This course begins Saturday 12th July. Names should be entered at once to secure admission.

All names for the Scholarship '91

CORRESPONDENCE

Class should be entere on or before 5th July.

In the Correspondence Department the following Tutors, as Specialists, will be responsible for the subjects set opposite to their names :—

SCHOOL METHOD and LOGIC. ... ... } Mr. C. W. CLAYSON, B.A., London University; Matriculation Honours, London University.

MATHEMATICS (Algebra, Euclid, and Mensuration).—Mr. POLLARD WILKINSON, B.A., B.Sc., London University; Matriculation Honours, London University.

ARITHMETIC.—Professor CUSACK.

ENGLISH GRAMMAR and LITERATURE.—Mr. J. W. SAMUEL, B.A., Lond. Univ.; Matriculation Honours, Lond. Univ.

PENMANSHIP.—Professor CUSACK.

GEOGRAPHY and HISTORY.—Mr. PERCY W. RYDE, Special College Lecturer in these subjects.

NEEDLEWORK.—Miss AMY K. SMITH, Diplomée of the London Institute for the Advancement of Plain Needlework.

SCHOOL HYGIENE and DOMESTIC ECONOMY.—Mr. P. W RYDE, Special College Lecturer in these subjects.

POLITICAL ECONOMY.—Professor CUSACK.

SCIENCE.—Mr. GEORGE HORSFALL, B.A., B.Sc., Lond. Univ.; Matriculation Honours, Intermediate Arts Honours, London Univ.

DRAWING.—Mr. J. VAUGHAN, Art Master, South Kensington; Specialist under London School Board.

LANGUAGES.—Professor CUSACK.

MUSIC.—Mr. W. R. PHILLIPS, R.A.M., Fellow and Examiner, Tonic Sol-fa College.

Owing to the unequalled successes attained for a series of years, the Principal is now able practically to **GUARANTEE SUCCESS** to all Certificate and Scholarship Students who begin with their course, and do the work prescribed weekly by the respective Tutors.

All applications for Prospectus, &c., to be addressed to

PROFESSOR CUSACK.

NEW CODE. SCHEDULE IV.

SARLL'S PRACTICAL BOOK-KEEPING,

ONE SHILLING.

New Edition, Enlarged, Simplified, within grasp of ordinary *Pupils, 128 pages. Contains a suggested course of study in* **'THREE STAGES,'** *with full Explanations, Keys, &c.*

A specimen copy for 6 stamps from

AND. SARLL, A.K.C., 62, Oakley Road, London, N.,

Lecturer on Book-keeping at People's Palace, E., Polytechnic, W.C., &c.

G. GILL & SONS, WARWICK LANE, LONDON.

J. KEEFE, F.R.G.S., F.S.Sc. (London), &c.,

63, BOLD STREET, LIVERPOOL; also at MANCHESTER.

ACADEMY for Civil Service Clerkships, Naval Cadetships, Engineer Students, Ceylon and Hong Kong Cadetships, Army Preliminary, and Factory Inspectorships; also for Banks, Business, Medical and Legal, Preliminaries, and all Professional Examinations. Over 450 successes. TUITION BY CORRESPONDENCE for Country Students.

Prospectus Free.

Post 8vo. Strongly bound. Price 7s.

CAREY'S

'GRADUS AD PARNASSUM.'

With the English Meanings. Recently Revised, Corrected, and Augmented by a member of the University of Cambridge.

London: Published by the Stationers' Company, Stationers' Hall, Ludgate Hill.

PITMAN'S SHORTHAND.

THE FOLLOWING LETTER HAS BEEN RECEIVED FROM THE EDUCATION DEPARTMENT:—

EDUCATION DEPARTMENT,
24th July, 1890.

GENTLEMEN,

Adverting to your letter of the 23rd inst., I am directed to state that PITMAN'S SYSTEM OF SHORTHAND has been recognised by the Department subject to a graduated course, such as the Department can approve, being proposed by the Managers of any public elementary school. The Graduated Course submitted by you would be approved, if so proposed.

I have the honour to be, Gentlemen,
Your obedient Servant,
(Signed) G. W. KEKEWICH.

Messrs. Isaac Pitman & Sons, 1, Amen Corner, E.C.

The Graduated course approved by the Education Department will be sent on receipt of post card, gratis and post free from

ISAAC PITMAN & SONS,
1, AMEN CORNER, E.C.
BATH AND NEW YORK.

J. STROHMENGER & SONS

IRON FRAME PIANOS.

SPECIAL MODELS
FOR
BOARD SCHOOLS,
IN SOLID OAK, WALNUT OR BLACK.

Now in use at many Schools and Colleges, and giving great satisfaction.

Illustrated Catalogue and Price List Post Free.

MANUFACTORY, 169, SHOW ROOMS, 206, } GOSWELL ROAD, LONDON.

MADE WITH BOILING WATER.

EPPS'S

GRATEFUL—COMFORTING.

COCOA

MADE WITH BOILING MILK

Tuition by Correspondence

ESTABLISHED 1871.

PUPILS may now be entered for Certificate (1st and 2nd years), Scholarship, Science and Art, Matriculation, A.C.P., and Musical Examinations.

Pupils for Certificate (2nd year men) may take the course for Mathematics only, if desired.

Scripture (for December and July), Languages, Special Subjects, Shorthand, Book-keeping, &c., from 10s. per quarter.

We draw attention to our Courses for Pupil Teachers, Army Schoolmasters and Mistresses, Civil Service Branches, Medical and Legal Preliminary, and to our new department 'Notes and Queries.'

Intending Students and Enquirers (for whatever subject or branch) should write at once to our Office, naming this paper.

Address, JAMES JENNINGS and Co., Tuition by Correspondence Office, Deptford, London.

The 'Practical Teacher' Sale and Exchange Column.

For Sale.—Moffatt's Third Year P. T. Course, 2s. 3d.; Todhunter's Larger Algebra, 5s. 3d.; Dr. Abbott's Shakespearian Grammar, 5s.; Canon Daniel's History of England, 2s.; Ross's History of England, 1s. 7d.; Geography of River Systems of World, 9d.; Geography of Coast Lines, 9d.; Hewitt's Geography of British Empire, 1s. 6d.; Todhunter's Euclid, 3s.; Magnus' Mechanics, 2s. 9d.; Dr. Aveling's Chemistry of Non-Metallics, 3s.; Manual of Our Mother Tongue, 5s.; Cornwell's School Geography, 2s.; Moffatt's Deductions, 2s. 9d.; Hughes's Physical Geography, 2s. 9d.; Pearce and Hague's History of England, 1s. Prices include postage. Most of the books are new and unsoiled.—H. Cecil, Musley-hill, Ware, Herts.

For Sale, in good condition.—Moffatt's Twelve Years' Scholarship Questions, new, (3s.), for 1s. 9d.; Curtis' Chronological Outlines (6d.), 3d.; Cornwell's School Geography (3s. 6d.), 1s. 9d.; Davidson and Alcock's Grammar and Analysis, new, (2s.), 1s. 3d.; Collier's History of British Empire (2s.), 1s. 3d.; Gill's British Colonies, nearly new, (2s.), 1s. 3d.; Chardenal's Second French Course (2s.), 1s.; Arnold's First French Course (5s. 6d.), 2s. 6d.; Smith's Principia Latina, Part I. (3s. 6d.), 2s.; Déjardin's French Class Book (2s. 6d.), 1s. 3d.; Todhunter's Euclid (Props. I.—VII. lost), (3s. 6d.), 1s.; H. Smith's Algebra (2s. 6d.), 1s. 3d.; Colenso's Algebra (4s. 6d.), 2s.; Otto's German Conversation Grammar (5s.), 1s. 6d.; Wrightson's Agriculture (2s.), 1s.; Tanner's First Principles of Agriculture (1s.), 6d.; Arnold's Greek Prose Composition (5s. 6d.), 2s.; Key to Ditto (5s.), 1s. 9d.; National Society's Sight-Singing for Schools, new (2s.), 1s. 3d.; Barnes' Notes on Matthew and Mark, new, (2s. 6d.), 1s. 6d.; Davies' Scripture Manual for St. Mark (1s.), 6d.; Bartholomew's Atlas of British Empire, new, (3s. 6d.), 2s.; Gill's Victoria Atlas (1s.), 6d.; Public School Latin Primer (2s. 6d.), 1s. 3d. Also lot of books suited for Certificate, Matric. (Lond.). and Inter. Arts Exams. on application (enclose stamp).—Address Master, Boys' School, Charlwood, Surrey.

NEW CODE.

BRIDGE'S DRAWING SERIES.

The most POPULAR and PRACTICAL Series issued.

Send at once for SPECIMENS and PRICE LIST, sent post free to Head Teachers.

A. G. DAWSON, 14, Ivy Lane, Paternoster Row, London, E.C.